

**10<sup>th</sup> ANNIVERSARY ISSUE**

**Backwoods**



**Home magazine**

*practical ideas for self-reliant living*

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How big is the  
**SOLAR SYSTEM?**

Places to live  
Kitchen tips and tricks  
An American hero  
Livestock choices



# Publisher's Note

## Complete "back issue set" winner

Steve Winters of Champaign, Illinois, is this issue's winner of a complete set of original back issues. We'll continue to draw names from among our three-year or longer subscribers for the next two issues and give the person whose name is drawn a set of the issues. The next drawing will be Nov. 5.

## Two new features

This issue inaugurates two new features: *Ask Jackie*, a question and answer feature by Jackie Clay, and a home-schooling feature, which will be written by various people.

Questions for Jackie's column (page 22) should be addressed to *Ask Jackie, Backwoods Home Magazine*, POB 712, Gold Beach, OR 97444. The question can be on any facet of low-tech self-reliant living, such as food growing and storage, animal care, etc.

The homeschooling column (page 16) will typically deal with science, mathematics, history, and economics. John Silveira has written the first one for this issue; John's Americana pieces, such as the one in this issue on page 62, also double as excellent homeschooling articles.

Our approach to these homeschooling pieces will be strictly utilitarian, that is, strictly educational. We're not going to talk about the politics of whether homeschooling is better than government-run public schooling. We're just going to get right down to offering some basic education to interested readers and their children.

## Duffy Dollars

Notice the Duffy Dollars on page 15. These will make the complete anthology set on page 14 a lot more affordable. "So what's the catch?" one reader who visited our Gold Beach bookstore asked. None! It's better for us to make a little money on each of a lot of sales; that's how Sam Walton made Wal-Mart a success.

## Bookstore

Our bookstore has been expanded, making it a nice place to visit the next time you are in Gold Beach. We've hung original art by Don Childers and John Dean on the walls, and also sell a variety of small self-reliance items. Since many on our staff are musicians, we even have 50s and 60s "rock and roll" sessions on some evenings.

The hours of the bookstore are Monday through Saturday, 8 to 5 Pacific Time. Any daytime visitor to the bookstore



O.E. MacDougal photo

Dave Duffy with 11-pound red snapper and 30-pound ling cod, caught off Gold Beach Reef

can have a free cup of Starbucks coffee plus a free copy of our famous "doom and gloom" issue. For the "rock and roll" sessions, we make you pay fifty cents for the coffee so we can dole out a few bucks to the band.

## Pocket-sized Constitution book for \$3

We've bought a couple of thousand copies of a shirt pocket-sized, 58-page book that contains the *Declaration of Independence*, the *U.S. Constitution*, including the *Amendments*. Henceforth we are giving the book away to anyone who either subscribes or renews their subscription for one year. Otherwise we're selling them for \$3 each, which includes postage and handling. These 3½-inch by 5-inch perfect-bound books were produced by the Cato Institute, a Libertarian think tank. They are high quality and a splendid little reference book you can carry in your pocket. For the money, they're a steal.

## Gold Beach fishing and our 10th year

Have you noticed the two fish I am holding in the photo on this page. They are why I moved the magazine to Gold Beach, Oregon. I love to fish, but I especially love to ocean fish. Size does matter.

This is the end of our 10th year in business. Thank you for supporting us all these years, and we will try to make our next 10 years worthy of your continued support. Δ



# My view

## Millennium excuses and the quest for truth

It's time to roll out the millennium excuses to explain why society hasn't collapsed as the result of the Y2K computer bug. I know I'm a couple of months early, but January 1 will be too late to make predictions of why we haven't succumbed to Y2K doom. So here's my list of what the excuses will be. Take your choice:

Predictions for Jan. 1:

- Society has collapsed, but the government is covering it up. Thousands are dead or starving, but it's such a clever coverup, it'll be years before we know the staggering toll.
- We calculated the date wrong so the collapse has been postponed six months to a year. Lucky for us because we've still got a lot of food storage supplies we need to sell.
- What are you talking about? I never said society would collapse. I knew all along that nothing would happen.
- And, of course, as the usual day-to-day disasters around the world *do* occur, the Y2K diehards will claim that every little disaster that makes the newspaper is due to Y2K.

Predictions for Jan. 2:

- Most doomsayers will find a new horse to ride, such as the planets lining up in one quadrant in the sky, or the impending visit by a close-encounter asteroid in 2028.
- Some government bureaucrat, maybe even Clinton, will take credit for averting the Y2K crisis, saying the government needs broad new power over computer technology to continue averting such crises in the future.
- Russia will ask the U.S. and the I.M.F. for big new loans because they'll claim Y2K devastated their already devastated economy. They'll get the money.

Predictions for Jan. 3:

- People who drew some money out of their bank "just in case" will begin putting it back, denying they ever thought there'd be a problem.
- The U.S. stock market will go up 250 points.
- At your local coffee bar, there will be very little talk of Y2K. It will be an embarrassing subject.

But all the concern about Y2K during the last year hasn't been a total waste of time. It's caused a mini boom in many sectors of the American economy. My subscriptions are up nicely, and once we get subscribers here we keep them with all kinds of incentives such as inexpensive anthologies and a magazine that is just too good, accurate, and honest to put down. A lot of other self-reliant businesses who have experienced significantly increased sales will have to put up with slow sales for awhile due to a glut on the market. I'm sure they are having sales meetings right now trying to identify a new doomsday scenario that needs promoting.

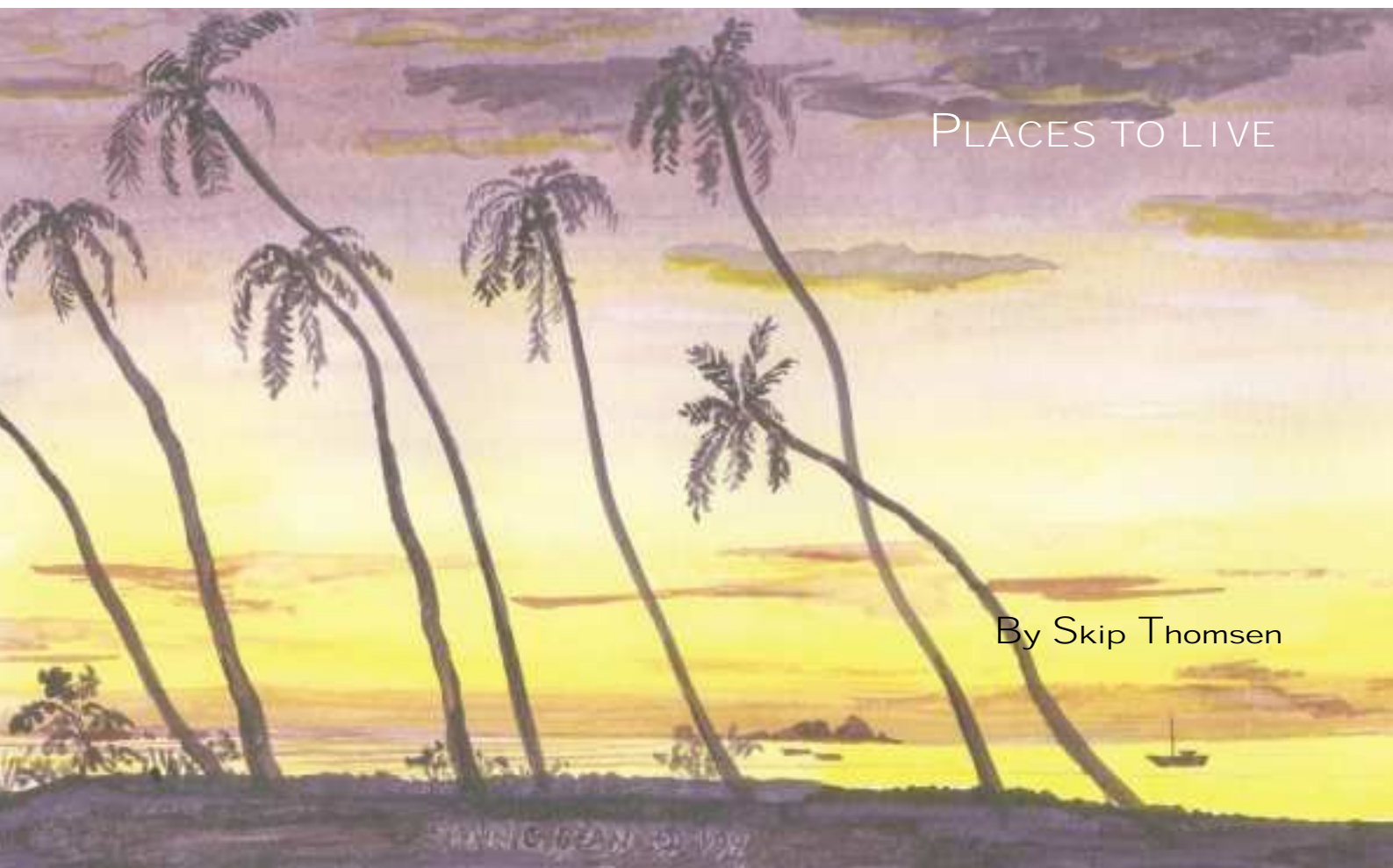
Have people learned anything from all the Y2K hysteria? The promoters of doom have, that's for sure. Never again will they ride a doomsday horse that has too many dates that were supposed to trigger the beginning of chaos. April 1, April 9, July 1, September 9, and October 1 were all trigger dates that came and went without Y2K incident. But I'm not sure the rest of the public has learned much. It's too much fun to get worked up about impending doom, making plans to avert it, and scaring your neighbors.

The whole experience has been dismaying to me. In an industry dominated by people who value American traditional values such as those embodied in the United States *Constitution*, it has been too easy for people to get distracted by phony "doom and gloom" scenarios such as this Y2K bug. Instead of zeroing in on what America's real problem is, namely, the declining state of freedom in this country, too many people spent all their energy on a phony Y2K crisis. Instead of concentrating on saving America, they concentrated on saving themselves from an imaginary enemy. If I had been an emerging tyrannical government trying to dissipate the angry passions of a people growing increasingly less free, I might have invented the Y2K crisis and would consider inventing many others just like it.

So being the Libertarian I am, and cherishing the freedoms enshrined in the U.S. *Constitution* the way I do, I thought I'd try my best to persuade people that Y2K-type crises are not our real enemies. And since you can only persuade people through knowledge, I thought the best way to persuade is by increasing people's knowledge about *real* things, such as *real* science, not the pseudoscience that accompanied the Y2K predictions of doom. So, starting with this issue, we are launching expanded homeschooling articles in the areas of science, mathematics, history, and economics in hopes of giving people a better framework from which to consider future doom and gloom scenarios like the Y2K crisis. If people can ward off bogus monsters, they'll have more time to battle the real monsters, like our emerging tyrannical government.

Self-reliant people, such as those who read this magazine, are the main soldiers in the battle to retain and restore America's constitutional freedoms. America needs these people, undistracted by phony crises, to help save America and her wonderful institutions of freedom and individual liberty. If our expanded homeschooling articles can help self-reliant people tell the difference between fiction and fact, we'll feel part of the huge battle that lies ahead.

For although this country was never on the edge of a Y2K doomsday, it *is* on the edge of a political doomsday. And if more of us don't get our heads straight and concentrate on the real enemy at hand, namely, our own government, America is going to become a 200-year bleap of freedom in the long history of tyranny that has reigned over people for all past millennia. — **Dave Duffy**



PLACES TO LIVE

By Skip Thomsen

# The good life on the Big Island

(This is the first of a series of articles on "PLACES TO LIVE" in the country. If you live in a great place and want to write about it, submit the article to *BHM*, P.O. Box 712, Gold Beach, OR 97444. Please include photos and an SASE.

— Editor)

**Y**ou've figured out the basics: you grow your own food, you have a small business that runs efficiently out of your home and supports your family, you're becoming more and more self-reliant . . . life is good. So how do you make it even better?

What if you could live where you can grow sumptuous tomatoes in December; where you'll have perfect weather year-round; never again have to burn anything just to keep warm; live in an environment of peace, quiet and tranquility where friends, neighbors and even strangers always have time for each other; never again have

to deal with a traffic jam . . . sounds too good to be true, right? Well, what if you could have all of that and much, much more and be able to enjoy that kind of a lifestyle for less money than you're probably spending now? What if you could buy a home or small farm there for a pittance?

No, I'm not talking about moving to some remote village in Indonesia or South America. I'm talking about life in rural Hawaii!

OK, ok, so what's the catch? Everybody knows it costs a fortune to live in Hawaii. Especially those of us who have had the opportunity to vacation there; we know how expensive everything is . . . don't we?

Here is perhaps one of the best-kept secrets of our times: the Big Island of Hawaii, along with being one of the only places in the Islands where there is still any semblance of the *real*

Hawaii, is actually a very affordable place to live. There are nice homes and small farmable acreages for sale here for less than \$40,000 (some friends of ours just bought a fixer on one acre of fantastic rain forest for \$14,000), one-acre lots in the most beautiful subdivisions imaginable for \$6000 (and less, if you look for them), and the taxes for a home (as opposed to an income property) are next to nothing. Many of the subdivisions allow small farming operations and home businesses, and there are many of both prospering all over the windward side of Hawaii Island. Some do not allow farm animals, but orchards, raising crops, and flowers are all OK. Small businesses, like light manufacturing, woodworking, and crafts operations are fine, too.

There are also more rural properties that are not in subdivisions and many



are already small farms with homes. Most are at rock bottom prices right now, too.

In Hawaii, “rural” equates well to “cheap.” For some reason, folks here like to be close to town, and all other things being equal, real estate prices drop for every mile that a property is farther out of town. Being off the grid is another reason for dramatic price-drops. We’ve seen some incredible bargains that were a mere 5-10 miles out of town and off the grid. There’s one near us, for example, that’s been on the market for some time now: several acres of prime land, some in forest and some cultivated, lots of fruit trees, a mile or so to the ocean, a well-built small house and a huge shop, all for \$75,000. It’s at the end of a mile-long road of small farms.

### Food costs

But what about groceries and just the cost of goods you need for day-to-day living? Well, you’re going to grow your own food, right? And even

if you don’t, there are farmers’ markets and little mom-and-pop produce stands all over the place that sell every kind of produce you could ever want (and lots you’ve no doubt never even seen nor heard of before) for tiny prices. Folks who come over here on vacation and buy their groceries—consisting of mostly imported, processed foods—in a tourist town, do pay some high prices. You can pay \$6 for a box of sugar-coated Korn-Krispies if you’re into that sort of thing. Or you can fill your trunk with fresh, picked-that-day produce for the same price.

And if you happen to love the ocean, then you also get some incredible perks here: an ever-so-inviting, crystal clear, warm and sensuous ocean that’s fun to play in all year long, and bountiful for fishing.

### Topical features

The Big Island is over twice the size of all the other islands combined, and yet its population is a small fraction of

just the city of Honolulu, and Honolulu is merely a small corner of the Island of Oahu.

The Big Island is Big! It’s a two and a half hour drive from one side to the other. We have two 13,800 foot mountains, all but one of the planet’s weather systems (Arctic), and this is one of the only places on Earth where you can go skiing in the morning and play on a warm, white sand beach a couple of hours later. The crystal-clear ocean is nearly always about 80 degrees, even when there’s snow on top of Mauna Kea.

### Farmers’ markets

The varied weather systems here make it possible to grow an incredible variety of produce. The higher elevations, like Waimea and Volcano, are much like Oregon or Washington weatherwise; the wet side of the Island is rainy and lush and is where most of the produce is grown. The lower elevations are where you’ll find the citrus fruits, mangoes, and





**Above left:** A small farmer's market stand featuring organic produce and healthy baked goods.

**Below left:** These folks are selling their home-grown tropical plants.

**Above right:** This artist uses her own photos to produce greeting cards, always popular in Hawaii.

leries and shops that are happy to sell locally made products.

### *Want a green thumb?*

Planting most things here is as easy as breaking a twig off of the parent plant and sticking it in the ground. Presto! A new plant!

Do you like to grow flowers? There's an abundant market here for flower-growers, and many of them grow flowers specifically to export to the mainland. Others sell theirs at the farmers' markets or to local florists, hotels, and other outlets. Most flowers are easy to propagate and grow here. Get one started, snip off the top and stick it in the ground, and you have two plants. Same with trees, too. Our neighbor has this beautiful Euphorbia, a tree with leaves the color of a fine red wine, and one day as I was admiring it she snapped off a branch and said here, plant it. I did, it grew immediately, and now I have about a dozen of them. All are from branches taken from the one she gave me. That tree is now about 20 feet tall . . . and three years old. I have a 40-foot African Tulip Tree that only five years ago started as a foot-long stick that I drove



papayas. There are abundant farms, large and small, and lots of the farmers sell their products at our many farmers' markets and even roadside stands.

Some of the more common offerings of these markets include tomatoes, sweet potatoes, huge varieties of greens, many kinds of oranges, grapefruit, lemons, limes, onions, mangoes, papayas, lilikoi (passion fruit), several different kinds of incredibly delicious bananas, macadamia nuts, coconuts, regular and the ultra-sweet and low-acid white pineapples, starfruit, lychee, rambutan, and lots of tropical fruits and veggies I'd never even heard of before coming here. Most of these are year-round crops, too. We had an orange tree at the place we just moved from that produces constantly; the next crop's blossoms are on the

tree while the last crop's fruit is still ripening. Until you've tasted an apple banana, you haven't tasted a banana. And after getting used to them, you'll never eat another grocery store banana.

And let's not forget the best coffee in the world: Kona Coffee. There are lots of successful and profitable coffee farms in the hills of Kona and some are as small as two acres. Of course there are much bigger ones, too, but even the small ones can do well.

The bigger of these markets, like the Hilo Farmer's Market which runs every Wednesday and Saturday, are also home to a lot of crafts vendors. And again, since this is a tourist destination, there are lots of events happening all over the Island that feature crafts fairs, plus there are many gal-



into the ground with a hammer. Really!

### *The people*

In rural Hawaii, people always have time for friends, neighbors, and even strangers. There's a popular pastime here called "talk story." You always have time to talk story. If you're about to leave your home to go on an errand and a friend shows up, you stop what you're doing and talk story. You have a cup of coffee, or whatever, but you always have time. That's why appointments have little meaning here: the bottom line is that people are always more important than anything else.

Speaking of people, one of the things we love about living here is that everybody is a minority. There is no prejudice here; what you look like or what your personal culture is doesn't matter. It's what's inside that counts. Especially here on the Windward side of the Big Island. The population is a

mix of Hawaiian, Chinese, Japanese, Filipino, Portuguese, haole (Caucasian), different Island cultures, and others. There is an obvious respect for everyone's culture, and each practices its own ways to whatever extent they wish.

The Hawaiian culture is alive and well here, and is being preserved and nurtured. It's truly heartwarming to us every time we see another example of the energy that the young people here, especially the Hawaiian kids of all ages, put into the preservation of their culture. The Hawaiian culture is built upon love and acceptance, family and friends, the land and the ocean. These are the important things; everything else is secondary.

### *Making money*

You may have heard that it's next to impossible to find work here. Not so. Well, let me qualify that. If you come over here and go the Employment Department and ask for a job, there



**Left:** The Windward side of The Big Island has few actual beaches, but spots like this make up for it.

**Right:** This geothermally-heated pool is usually 92 degrees, slightly saline and immensely therapeutic. A wonderful way to spend an hour or two after a hard day's work.

isn't likely to be one. In the first place, there aren't that many available, and when they do come up, the locals are more likely to get them than are newcomers. But there is lots of work available to those who do not need a boss to tell them what to do next. Almost all of our friends are self-employed, most in the arts or crafts areas, and all are doing well. The way it is here is that if you know how to do anything well, you'll have all the work you want.

We've got friends who are woodworkers and are as busy as they wish to be trying to keep up with the demand. Our nearest neighbor makes clay jewelry in her home; she is about 40, has her beautiful home on three acres paid for, her car paid for, and she salts away money every month.

Another neighbor opened a gallery nearby and sells the work of selected artists and craftspeople. She has expanded her gallery several times in the last few years and is doing very well. Her husband makes furniture out of Koa, a beautiful indigenous

Hawaiian wood, and he is always behind in his orders. Others include successful photographers, fine artists, farmers, fishermen, builders, tree trimmers, B&B owners, house cleaners, yard maintenance people, and owners of various stores and restaurants. Remember, this is a tourist destination, and although this side of the Island gets far fewer tourists than the drier Kona side, there are still enough that there are lots of opportunities serving that population. There's even a market here for good musicians.

An opportunity that's fairly unique to here is house-sitting. There are always folks who need to travel to one place or another and need dependable folks to take care of the home while they're away. These arrangements are from short-term, like a week or two, to many months.

We also know of several people who have made successes of computer-based home businesses. They simply found different people who had a need to be connected, and they became the liaisons. We know of a woman who started an Internet vacation rental listing service, and before her first year in business, she had over 1000 listings. She charged a very affordable \$100/year to her clients, put each listing on an attractive Web page, and that's all she needs do from there on in. She collects \$100/year from each client each year for the continued listings, and the clients are thrilled to receive world wide advertising for their rentals for such a low price. She now has several thousand listings at \$100/year. Do the math!

We've amazed several of our mainland artist friends when we introduced them to our friends here who are supporting themselves quite well with their art. The more common scene on the mainland is that artists must have a "real job" to support their art.

Another friend runs aquarobics instruction at a local public pool and at a close by huge, geothermally-heated tidepool. Not a bad way to earn a

living. The tourist trade here also brings us other options, including vacation rental maintenance (badly needed, too), wedding coordinators, and food service opportunities.

### *Some basic research*

OK, so you say you'd like to give it a try . . . where do you start? I'd suggest a visit first, of course, the longer the better. Then if it feels right and you decide to really do it, it's a good idea to rent a place in whatever area felt best to you on your visit. There is so much variety here that it takes a long while to feel all of it. We've finally come to the place we've been looking for for years, and that's after spending a lot of time feeling every square inch of this Island. I'd suggest looking through the realtor's catalogs of offerings and becoming well informed of property values, how long things stay on the market in the area of your choice, and how much they sell for compared to the asking prices. There's often a big spread there.

All of Hawaii has been in a real-estate slump for the last few years. Things are beginning to pick up again, but slowly. It's my feeling that prices are now at about rock bottom, so there has never been a better time to buy.

If you feel fairly certain of a particular area, you might do well to buy a fixer that you can get really cheap, and then if you decide to move elsewhere in a year or two you can most likely make some money on it.

Furnishing a house here is really easy and cheap, what with all the itinerant population and the many garage sales. It rarely pays to ship your belongings, unless you have a lot of very special or one-of-a-kind stuff that you're seriously in love with. Appliances, especially, are heavy and costly to ship, and they cost very little more here new and there are lots for sale used. Same with cars and trucks. Shipping your belongings over is still reasonable, as the ocean shippers give a great rate for household goods.

Depending on where you are on the mainland, it might cost you more to get your things to the West Coast than across the ocean. The shipping points are Seattle, Oakland, and LA.

If you are likely to want to build your own home or homestead, it will cost about the same as on the mainland. The basic building materials are higher because they must be imported and all lumber must be treated, but then you need no insulation and no heating systems, and it is still possible to build some pretty basic structures here, and that about evens things out.

Do some research on the Internet. "Planet Hawaii" has some interesting material, and typing "Big Island hawaii" into any search engine will bring you lots more.

### *In conclusion*

If thoughts of year 'round perfect weather, year 'round sunshine for your solar ventures, a laid-back lifestyle of unhurried peace and spiritual tranquility, some of the best growing conditions imaginable, world-class fishing at your doorstep, opportunities limited only by your imagination, and friendly, gracious people all sound like they make for an interesting possibility for your new home, the Big Island of Hawaii may be for you. Lots of people still believe that living in Hawaii is expensive, and on all of the other islands, it is. Here on the Big Island, it isn't. Δ

## **Need more information?**

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**[www.backwoodshome.com](http://www.backwoodshome.com)**



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## How big is the solar system?

By John Silveira

**I**n artists' renderings of the solar system we often see the sun represented by a small sphere with the planets drawn fairly close by. In truth, drawings like that aren't even close to the real dimensions of the solar system. But artists must draw the solar system this way because it's the only way to get all the components of the solar system onto one page.

But what is a true perspective of our solar system?

Here's a good experiment for homeschoolers—or anyone else who wants to see how immense the solar system really is. Take a basketball and imagine that it is the sun and everything else in the universe is to the same scale. In our basketball-sun model, how big do you think the planets would be and how far away do you think they'd be?

To get a perspective of how far away the planets are, place the basket-

ball on the ground and walk away from it.

How far?

Since the diameter of the sun is 864,000 miles and the diameter of a typical basketball is about  $9\frac{1}{2}$  inches (they vary from  $9\frac{1}{4}$  to  $9\frac{1}{2}$  inches), if we divide 864,000 miles by  $9\frac{1}{2}$  inches, we discover that in our model 1 inch represents roughly 91,000 miles. To see how everything else fits into our model we need only divide any other dimensions of our solar system by 91,000. For example, Mercury, on



the average, is about 36,250,000 miles from the sun. If we divide 36,250,000 by 91,000 we find that in our model it is roughly 398 inches—or about 33 feet away from the basketball. And, if we divide Mercury's diameter of 3050 miles by 91,000, we find that the Mercury in our model is just .034 inches wide—about  $\frac{1}{30}$  inch. This is smaller than a typical BB.

If you know your stride (mine is about  $2\frac{1}{2}$  feet) you can put the basketball on the ground and pace this off. Better yet, if you have access to a football field at a local high school or college, place a basketball on one of the goal lines and walk out to the 11 yard line. This is where Mercury is.

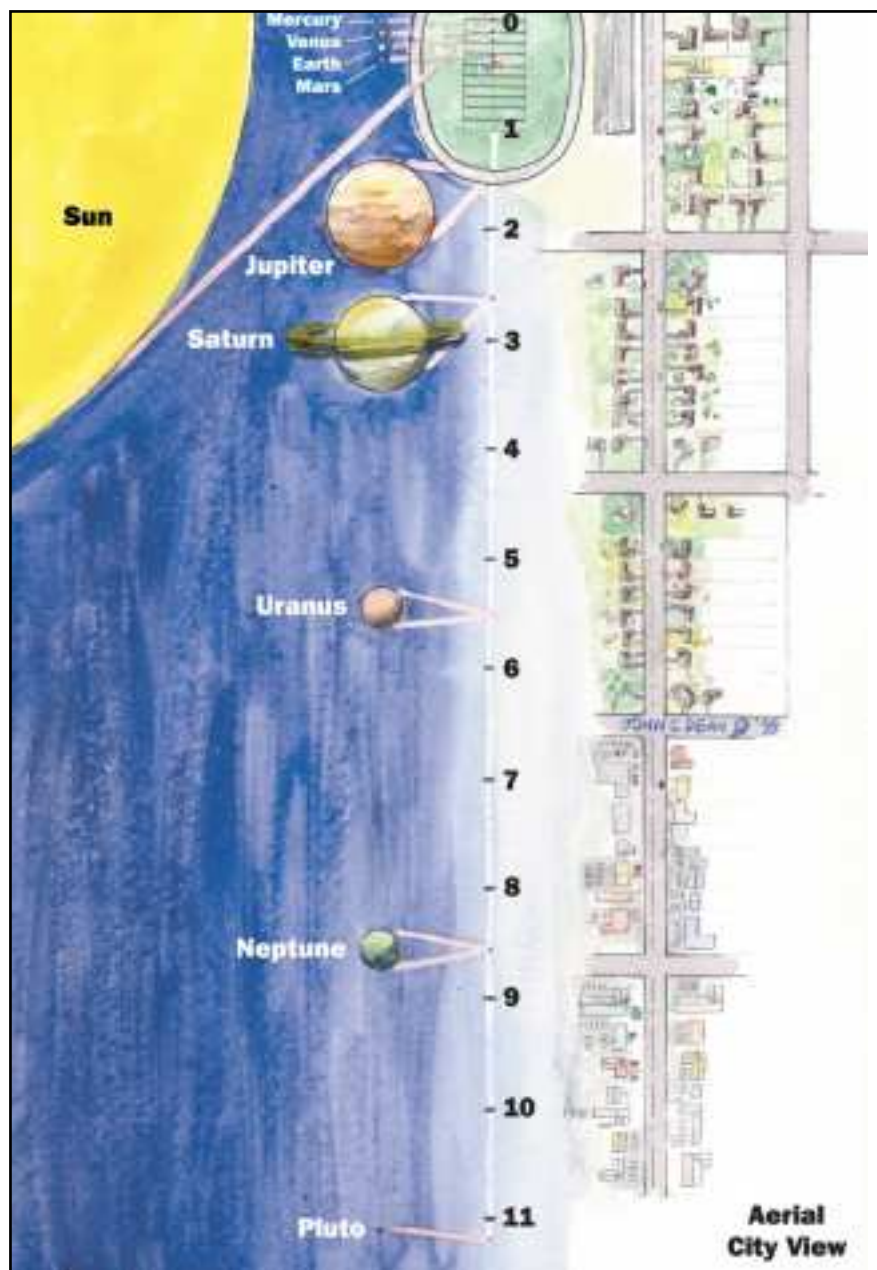
You can perform these calculations for the distances and diameters of each of the remaining eight planets. I've done this for you and placed them in Table 1.

To locate Venus you will have to get about 62 feet from the ball—that's just beyond the 20 yard line. Venus, incidentally, would be a small but bright pebble about  $\frac{1}{12}$  of an inch in diameter.

Earth is about 86 feet away from the ball—that's almost at the 29 yard line on a football field—and it's slightly bigger than Venus. But unlike Venus, earth has a satellite, the moon. In our model it will be a mere  $\frac{1}{40}$ -inch in diameter and orbiting about  $2\frac{2}{3}$ -inches from the earth.

If you can, do this exercise on a day when there's a full moon visible in the sky because if you feel this scale isn't right, now's the time to judge for yourself. Even though the moon is much smaller than the sun, because it is near to us and the sun is so far, they appear to be the same size. (That's why during a solar eclipse the moon appears to cover the sun almost perfectly.)

So to check this perspective, stand where the earth would be, 86 feet—or almost 29 yards—from the basketball and hold a pencil perpendicular to the ground at arm's length, so you see the basketball just over it. Compare the basketball's apparent diameter to the pencil's diameter. Holding your pencil



On the left are the relative sizes of the sun and the planets of our solar system. On the right is a neighborhood containing a football field. To build a scale model in which the sun is the size of a basketball and rests on one of the goal lines, only the four inner planets would fit within the football field; the outer planets would lie well beyond, some even several blocks away.

this way, the basketball appears to be about half as wide as the pencil. Now hold the pencil so you can just see the moon over it and compare the moon's diameter to the pencil's. You'll see that it appears to be the same size as the basketball. I hope this gives you some faith in my model and you realize the scale is accurate.

But whatever you do, don't look at the sun like this to get a comparison; it's a sure way to permanently damage your eyes.

Once you make this comparison, you can go back to where Venus and Mercury are and hold your pencil at arms length to see how large the basketball appears. It will appear larger from these vantage points and give

TABLE 1: THE SOLAR SYSTEM				
Body	Approximate equatorial diameter in miles	Mean distance from the sun in miles	The solar system in our basketball sun model	
			Diameter in inches	Distance from the basketball sun in feet
Sun	864,000	-	9.500	-
Mercury	3,050	36,250,000	0.034	33
Venus	7,560	67,500,000	0.083	62
Earth	7,960	93,500,000	0.088	86
Mars	4,250	142,438,000	0.047	130
Jupiter	89,360	486,250,000	0.983	445
Saturn	75,340	891,875,000	0.828	820
Uranus	31,950	1,794,375,000	0.351	1645
Neptune	30,690	2,815,000,000	0.337	2580
Pluto	1,440	3,687,500,000	0.016	3380

you a fair idea of how large the sun appears when seen from either of these planets.

The next planet out is Mars and in our model it's 130 feet away from the basketball, or about 43 yards from the goal line. The basketball appears a lot smaller from here, as does the sun from Mars. Mars itself would be less than 1/20-inch in diameter. It also has two satellites, but in our model those would be specks of dust orbiting less than 1/6 inch from our planetary model, and they would be all but invisible to us.

Throughout this scaled down solar system there would be a scattering of dust, finer than the motes of dust you see floating on the rays of sunlight that stream into a house on a summer's afternoon. This "dust," though extremely sparse, would be thickest between the orbits of Mars and Jupiter. This is the asteroid belt.

Beyond the asteroid belt is Jupiter, the largest planet. In our model it's

almost an inch wide and 445 feet—or almost one and a half football fields—away from the basketball. 445 feet is beyond the home run fences of most major league ballparks. A basketball, sitting at home run distance, would appear quite small from home plate, and the sun appears quite small from Jupiter.

Jupiter also has about 16 satellites, only four of which we would see in our model, appearing as grains of sand, while the rest would be specks of dust like Mars's satellites. Incidentally, Jupiter has more mass than all the other eight planets, all their satellites, and all of the asteroids in our solar system, combined.

Saturn is 820 feet away from our basketball. That's almost three football fields away. It is also the oddest looking of the planets. In our model it is 5/6-inch in diameter along its equator but noticeably smaller, only 3/4-inch in diameter, along its poles, so it looks like a flattened sphere. It also has a

ring around it that is 1 5/6 inches in diameter.

Like Jupiter, Saturn has a swarm of satellites, only one of which—Titan—is significant. The rest of Saturn's satellites would be invisible, or nearly so, in our model.

The next planet out, Uranus, is 1/3-inch in diameter and it's 1645 feet away. That's almost a third of a mile from the basketball. It has at least five satellites, all of which are like tiny grains of sand in our model.

And after that is Neptune, also 1/3-inch wide, but it's about a half mile away from the basketball. The basketball appears quite small from a half-mile. Neptune has at least eight satellites, only one of which would be as large as a grain of sand in our model.

Last is Pluto. Pluto is just a grain of sand, actually two grains in our model, because Pluto's satellite, Charon, is about half the diameter of Pluto. Pluto's average distance from the basketball would be almost 3400 feet. That's roughly 2/3-mile. But because its orbit is so eccentric, sometimes it is a little closer to the basketball than Neptune—a half mile away—and at other times it's 5/6-mile away. Standing 2/3-mile away, you'd barely be able to see the basketball. In reality, if you could stand on Pluto, the sun would appear as no more than

TABLE 2: THE EARTH-MOON SYSTEM				
Body	Approximate equatorial diameter in miles	Mean distance between the earth and moon in miles	The earth/moon system in our basketball sun model	
			Moon's diameter in inches	Distance from the earth in inches
Moon	2170	240,000	0.024	2.64



the brightest point of light—the brightest star—in a very black sky.

Beyond Pluto in our model, to a distance of 16 miles, is a haze that represents the Ort cloud; this is where comets are born.

There are some other interesting aspects to our model. For instance, in the real world the speed of light is approximately 186,284 miles per second. But in our model light moves only two inches per second or about 10 feet per minute. It takes almost 8½ minutes for a beam of light starting from the sun's surface to reach our earth, and it takes more than five hours to reach Pluto.

In one year light travels almost six trillion miles. Written out, that distance is 6,000,000,000,000 miles. In our model one light year is just about 1,000 miles. This means that if our basketball size sun were perched atop the John Hancock Building in Boston, Massachusetts, then St. Louis, Missouri, would be one light year away.

So you can see, when placed in proper perspective, our solar system is immense, but it is also mostly empty space with a few almost insignificant objects in it. And it is also extremely isolated. In spite of the number of stars we see in the night sky, none are really close to us. The very closest, other than our own sun, are the three stars that make up the Alpha Centauri star system: Alpha Centauri, Beta Centauri, and the closest of the three, Proxima Centauri. These stars are about 4.3 light years away. In our model, 4.3 light years are about 4400 miles, approximately the air distance from Boston to Moscow, Russia. The brightest, Alpha Centauri, is about the same size as our sun and can be seen from earth. In other words, in our model it's as big as our basketball, it's 4400 miles away, and we can see it, but only as a point of light. So, if we wanted to create this star system, to be in perspective with our model, you would have to locate it 4400 miles away.

At least 95 percent of the stars in our universe are smaller than our sun, but there are some that are much larger. They can be as much as 400 times bigger. Compared to our basketball, such a star would be a sphere that reaches from one goal line of a football field to the other—100 yards in diameter.

Also, as our own sun ages, and burns up its nuclear fuel, it will become what astronomers refer to as a red giant. Its diameter will expand and it may extend well beyond the earth's orbit. In our model this means the sun will inflate until, eventually, it is 70 or so yards wide. This will not occur for another five billion years, but when it does, Mercury, Venus, and—assuming it gets large enough—earth will be vaporized. All three will cease to exist.

If this doesn't give you an appreciation for the vastness of the universe,

consider if we expanded our basketball-sun model to include the entire galaxy we live in, the Milky Way. The Milky Way is about 100,000 light years in diameter. We would have to make our model 100 million miles wide. This means that to make a model of our galaxy where our sun is the size of a basketball, our model would have to reach from the sun to a point some 10 million miles beyond the earth.

The edge of the universe, if it's proper to talk about the universe having an edge, is thought to be about 15 billion light years away from us in all directions. Distances this large are incomprehensible. To extend our model to include the entire universe we would need all the space between here and Alpha Centauri—and at least 10,000,000,000,000,000,000,000 basketballs of various sizes. Did somebody say, "Wow!" Δ

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# Ask Jackie

(Jackie Clay invites *BHM* readers to submit questions on any facet of low-tech, self-reliant living for this new column. )

*Would you be so kind as to ask Jackie Clay how to can wieners and link sausage you buy from the store? I'd like to give it a try.*

Elaine Hales, Shepherd, Texas

*Do you can sausage, bacon, and meatloaf?*

Nancy Green

Yes, you can home can link sausage and wieners, as well as bacon. I often do it, as when we butcher or get wieners on sale. You can also can any other store-bought or home made sausage, such as salami, pepperoni, bologna, etc.

The only problem with canning sausage or wieners in a casing is that often the meat will swell, splitting the casing, which does nothing to hurt the taste or edibility of the product but it will result in a visually less appealing product.

When canning any sausage in a casing, pack them cold in a clean pint jar, upright, and as snug as you can get them without force. Use no liquid. If you use liquid, they will swell much worse, and some of the liquid will boil out during the processing, possibly resulting in an incomplete seal.

Wipe the jar rim with a clean cloth, put on lids which have been boiled in water and are still warm, then tighten rings down firmly. Process in pressure canner only for 75 minutes. If you use quarts, process for 90 minutes at 10 pounds of pressure. (If you're more than 2,000 feet above sea level, see your canning book for altitude adjustments.)

When canning bacon, it's best to use only lean bacon, either unsliced or sliced but kept in one chunk, and trimmed to fit into the jar you will be using, either pint or quart.

You'll find that wide mouth jars work best. Be sure to leave an inch of head room above the bacon. Pack the uncooked bacon in the jar snugly, then seal and process as above.

I've found it better to can sausage patties, rather than link sausage, just for visual effect. Besides you don't have to use casing if you are making your own from home grown pork or venison. Simply fry the patties lightly, browning them a bit. Add a small amount of water to the sausage fat. Lift sausage patties and stack to within an inch of the top of the jar. Then add about 4 tablespoons of the juice to each jar. Wipe rims, put on lids, and screw bands down firmly. Process pints for 75 minutes and quarts for 90 minutes. The basic pressure for all meat is 10 pounds, but adjust the pressure upward for elevations over 2,000 feet.

*I have a couple of questions for you.*

*1. You often speak of buying #10 cans of items from a "preparedness company." I would like to do this, but where do I buy them? Is there an address I can order from?*

*2. I have chickens and a lot of eggs. Is there any way to dry eggs at home? I have used dried eggs at the store, but would like to be able to make my own.*

Kathy Bower, Redfield, Kansas

#10 cans are the nearly-gallon sized cans of food found in larger supermarkets and restaurant supply houses in most cities. Most will also sell to private parties like you and me. Dehydrated foods are found on occasion in restaurant supply houses but



**Jackie Clay**

more often at preparedness companies, such as regularly advertise in *Backwoods Home Magazine*.

We also have chickens, but I don't believe there is a safe way to home-dry eggs due to the possibility of salmonella or other bacterial contamination. This goes for milk, as well. My hens generally lay all winter, but when they seem to be slacking off I gather several dozen clean, fresh eggs, pack them unwashed in cartons, and place them in a very cool area—refrigerator or back corner of a 40° winter pantry. These will nearly always last till the "girls" are laying abundantly in the spring. My dried eggs are on the shelf, just in case.

I would also like to answer the questions that Lisa Evers (p.81 of the July/August 1999 *BHM*) had on milk cows, as I feel her frustration. It read, in part:

*I want to have a couple of dairy cows so that I will have enough milk for my family. How much milk will this one particular breed give me on a daily basis? What do I feed her/them? What kind of shelter do I need? What equipment do I need for milking? What about daily and annual care requirements? Where do I get all this stuff? I have been doing a lot of*



*research on the Internet, at the local library, new and used bookstores, have contacted various associations... and the only conclusion that I have come up with is that I am going to have to work damn hard, and will make a lot of mistakes simply because it is virtually impossible to find the needles.*

Lisa Evers, Charlotte, NC

Lisa, having your own dairy cow is no where near as complicated as you may think. If it was, we sure wouldn't have a milk-cow-in-training right now (a two year old heifer). We have always had a milk cow or two, and we had many dairy goats at one time, which were as good as a cow for all dairy purposes.

My day with a cow goes like this: Morning, give hay to cow and clean up manure. In the winter she is kept in a stanchion with a wood platform raised to allow an 18-inch deep by 18-inch wide gutter behind her to keep the urine and manure off her body when she lays down. Plenty of straw bedding keeps her comfortable. She goes out for exercise during the day, and returns in the late afternoon on all but the coldest, blizzardy days. I carry out two buckets, one with warm water and a clean cloth to wash her udder, and a larger stainless steel milk bucket.

After she is watered and her bedding cleaned, she is munching hay happily. I wash her teats with warm water and let them air dry while I get her grain and dump it into her manger.

Then I sit down on her right side, facing her side, lean my head into her warm belly and begin milking. The first stream from each teat is sprayed into the washing cloth to make sure there are no clots or blood streaks, which could indicate mastitis, a common dairy animal infection.

When all teats check out okay, I milk her, two teats at a time, in rhythm. It doesn't matter what breed of cow you choose, even a tame beef breed provides more than enough for family use. Pick one that you like and

is used to being hand-milked. When I have enough milk for my needs, I turn her calf with her to finish. Most of my cows will raise not only their own calf but at least three calves I buy at the sale barn each year, in rotation, as they are weaned. The benefit of having a calf available to nurse is that you don't have to be tied down to a milking routine. If you plan on going away for a day, just leave the cow in a pen with the calf or turn them out on summer pasture together.

The fresh warm milk is then strained, either through a commercial milk strainer (available at most feed stores or ranch supply stores) or a sterilized old tea towel (Don't wash them in scented detergent.).

The cow is milked morning and night. She is fed plenty of good grassy pasture, plus alfalfa or clover/grass hay in the winter, a dairy cow mixed ground feed or high protein sweet feed, depending on your preference. She needs access daily to a mineral-salt block. All feed and most equipment can be bought locally and relatively inexpensively.

Having any animal requires work, but a cow is *not* a big job and most folks find having one very relaxing. Besides, you will have homemade whipped cream, cheeses, butter, sour cream, ice cream, and even beef if you raise a steer calf each year to butcher when it is two or three. All will be much better than any store-bought products, and they won't make you glow in the dark. Plus you'll have manure to add to your garden's compost pile. Δ

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## **SEND IN THE WACO KILLERS**

**T**hree times the International Society of Newspaper Editors has included Vin Suprynowicz in their list of the 12 top weekly editorial writers in North America. For years his shoot-from-the-hip style has opened the eyes of thousands to government abuse of our liberties. In this book, *Send in the Waco Killers*, he blends material taken from his syndicated column with new commentary to give the reader a detailed, reporter's-eye-view of how the rights and freedoms of Americans are being subverted.

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# Ayoob on Firearms:

## Defending your lifestyle

I was sitting in the witness box, an expert witness for the defense, in a courtroom out west not long ago. The opposing lawyer was conducting cross examination, and not having much luck with it. It wasn't a case if "I was hot and he was not." It was a matter of the side that brought me in being right, and the side that hired him being wrong.

His law school tuition had not been wasted. He clearly remembered what the law professors and trial tacticians must have taught him. "If the law is on your side, argue the law. If the facts are on your side, argue the facts. If neither the law nor the facts are on your side, assassinate the character of the witness."

If the facts and the law hadn't been with the defense, I wouldn't have taken the case for them. I had known what would be coming. Fish gotta swim, dogs gotta bark, and lawyers with no case gotta do something they call "destructive cross." It's the nature of the beast. I don't hold it against them.

Having exhausted all meritorious questions and getting answers he didn't want the jury to hear, he played what he thought was his trump card. "Mr. Ayoob, do you write a column for a publication called *Backwoods Home Magazine*?"

My ears perked up. This was something new! I answered in the affirmative.

Then he got going on Y2K, the whole "survivalist" rant, and finished up by asking me if I trained people to prepare for "Armageddon." I laughed out loud, something I rarely do in

front of a jury, and explained that I taught people to be prepared for crisis in all its forms.

What the lawyer was trying to do was to take advantage of media distortions that have tried to portray people who practice self-sufficiency and crisis preparedness as either "the world is coming to an end" weirdos, or fanatical paramilitary militia types. It's a "dirty debate trick" called *argumentum ad hominem*. If you can't attack the man's argument successfully, attack the man.

He or one of his staff had apparently run my name through the Nexis computer to pick up work in print. If

*Every now and then, they ask you a question that is their business. It helps to have the answer ready.*

they'd actually read what I'd written in *BHM*, I don't think they'd have brought it up.

I don't have the transcript in front of me, but basically the repartee went like this. He was trying to paint me and anyone who prepares for crisis as some sort of Armageddon cult, and I was explaining that stocking up on food, generators, and defensive firearms in a time when the media is predicting massive shortages of food-stuffs, power outages, and breakdown of law and order, is simply common sense. I commented that keeping a year's supply of food on hand is considered standard procedure in certain cultures, from the nation of Switzerland to the Mormon church.

The lawyer winced. The trial was taking place in Salt Lake City. He



**Massad Ayoob**

realized he was ticking off the jury and making a fool of himself.

He made one last try, attempting to inveigle me into saying I thought every home should have an "assault rifle" or something to that effect. I replied that there was in fact one assault-related piece of gear I felt every home should have

for Y2K, and that he must have read about it if he'd been through my work in *BHM*.

His ears perked up. He looked like a fisherman who just felt a pull on the line. The lawyers on my side, however, looked worried as hell.

I explained that the piece of kit in question was a Rhodesian ammo pouch. It is designed to hold five magazines for a Belgian FN assault rifle, arrayed across the wearer's chest.

The jury was leaning forward intently. The cross examiner had a look of triumph on his face. The lawyers who had hired me went pale.

The reason for the Rhodesian ammo pouch, I concluded, was it was exactly the right size to hold five cold cans of your favorite beverage, leaving the sixth one in your hand. I explained that my plan for Y2K was to watch

the clock pass midnight, watch society not collapse, and open a cool one to toast the New Year at the first opportunity.

The jury burst out laughing. The defense lawyers looked like they were going to collapse in relief. The cross examiner's face turned a bright and angry red. The cross examination was done.

The plaintiff's case was in tatters. That night, the lawyer who had cross-examined me went to the ones who had hired me and offered to settle for chump change. The amount was so small that the insurance company insisted on going with the settlement. The lawyers considered it a victory.

So, what's the point?

Only this. There are a lot of people who can't tell preparation from paranoia. There are others who know the difference perfectly well, but for reasons of personal agenda will attempt to distort the truth.

Being prepared for any crisis, whether natural disaster or social upheaval, is as natural and logical as exercising and eating healthy foods.

Taking care of yourself physically doesn't mean you're a hypochondriac. Having fire extinguishers and smoke alarms doesn't mean you have a phobia about fire. Being ready to protect yourself and your family doesn't make you paranoid.

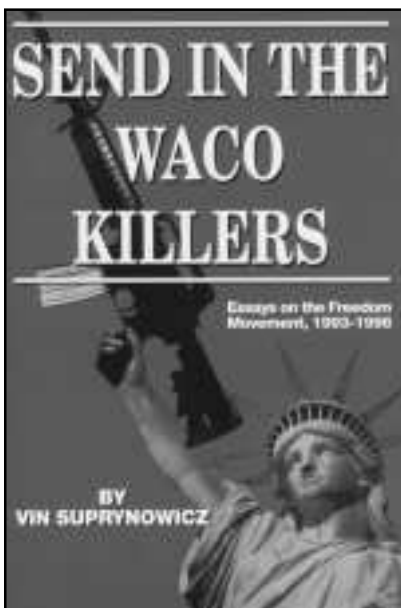
Whether the fight is verbal or physical, the first law of human conflict is to be able to predict where the attack will come, and already have a counter in place for it. If your lifestyle and values are subject to deliberate or accidental misinterpretation, be prepared to defend that lifestyle and those values as surely as you stand ready to protect yourself and yours.

(Massad Ayoob is the author of several books, including the authoritative text on deadly force, In the Gravest Extreme: the Role of the Firearm in Personal Protection. He is a police captain in New Hampshire, and is the director of Lethal Force Institute, P.O. Box 122, Concord, NH 03302, which offers training and judicious use of deadly force and firearms at locations around the country. He has won several state combat pistol championships and two regional championships, and he has published more than 2,000 articles on firearms, self-reliance, and law enforcement.)

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# Practical livestock for the homestead

By Amelia Porter

**R**aising livestock is an integral part of the homestead experience. But newcomers often ask me, which livestock should I start with? The answer to that question is a very personal one, but I will say that in a small homestead situation (where space and financial resources may be limited) animals which can provide the greatest diversity with the least amount of feed and supplies are the most practical choice. It is also good to pick animals that will not require a beginner to learn too many new skills, that are inexpensive to set up, easy to handle, and cannot present a danger to your family. Here is a brief overview of a few animals that fit nicely into this category. We'll skip rabbits, an obvious choice, because *BHM* covered them last issue.

**Poultry:** No homestead is complete without some kind of poultry. Chickens, geese, ducks, turkeys, and guineas all offer some measure of diversity with little feed and care. Geese provide the most benefit for the least money, and so I will start with them.

**Geese** provide meat, eggs, down, feathers, and fat. The fat is used not only in lotions & soaps and for cooking, but also makes excellent lamp oil. The feathers can be used for making quill pens, toothpicks, and other small items. The real advantage to geese is that they are classified as a true grazing animal (the only one in the poultry world) which means that 95% of their diet is just plain grass. This makes their feeding and management very simple. Even in winter, geese will dig through the snow to get at the grass, providing the ground is not too frozen to allow for this. They will eat hay when fresh grass is not available, and will also eat grain. The grain is a good

idea if you want maximum production and growth rate out of your geese, but it is not essential. Domestic geese do not fly, so a 30" fence works fine for containment; and they don't scatter when you try and catch them, as other poultry will. They are not as prolific as other poultry, so you do need a pretty fair sized flock if you are raising them for meat, but what they lack in production they make up for in diversity. Not to mention the superior flavor of roast goose - yum!

Geese (like other waterfowl) do not require ponds or creeks as is commonly thought, but do fine with just a bucket of water tied to the fence. Be sure to tie it securely or they will tip it over in their zeal to play in it. Geese have no particular desire for shelter except the occasional shady spot in summer, windbreak in winter, and some secluded place where they can build a nest. The natural vegetation found on most farms provides for this just fine. Unlike most other poultry, geese are not bothered much by small predators such as skunks and raccoons, and only are vulnerable to these when young.

The picture in most people's minds of a loud and angry goose chasing someone or biting them is not as accurate as you might think. Different breeds and strains (bloodlines) of geese are more or less aggressive. The Oriental breeds, such as Chinese and African (recognized by the knobs on their heads), are the most likely to behave in this territorial manner, while the European breeds (no knobs) tend to be quiet, docile, and very polite. Crossbreds between the two categories are often extremely aggressive while crossbreds from within the same category tend to reflect the temperaments of their parents. If you are after very calm geese, I recommend purchasing them from someone who breeds for showing. While mass-pro-

duced commercial geese are bred with no thought given to temperament, geese bred for show are generally bred to be very docile, to put up with being confined in small cages and being handled by the judges during show season. Show-bred geese are also generally larger and have a better meat carcass.

**Chickens and Ducks** are next on my list of suitable poultry. Both of these require more protein than geese, and so need a lot of bugs, meat scraps, or a regular supply of grain in their diet. If you keep your poultry in an enclosed area, where bugs are in short supply, you can place a light bulb or lantern behind some screen at night and your birds will eat the bugs who swarm around the light. Chickens and ducks are both excellent choices for the homestead, providing meat, fat, and eggs. The tip of buying show-bred poultry does apply to all waterfowl (like ducks), but does not apply to chickens. Chickens bred for show are bred for things like feather quality and color, and often their good production qualities are sacrificed in the bargain. When buying chickens, try and find strains which have been bred for hardiness, good feed conversion, and high egg production.

**Chickens** are the trash cans of the poultry world, and will eat almost anything. By this, I don't mean just your garden waste, but the butchering waste, too. Chickens will eat road-kill right down to the bare bones. They will polish off melon rinds, old fruit, stale bread, sour or curdled milk, and anything else you toss their way. They also eat mice and snakes when they can catch them, a quality which some people appreciate. This opportunist's diet has no ill effect on them. In fact, studies have proven that chickens fed on a diet of 25% flies, 50% weeds, and 25% grain produce as many eggs

as chickens raised entirely on commercial feed.

While housing your chickens in a designated building at night does help with predator control and make it convenient to gather the eggs, a building of some sort is not strictly necessary. Chickens can roost relatively safely in trees and will find nesting spots around your yard. Once you discover where they are laying, simply replace the eggs you gather with good quality fake eggs (leave about six fake ones) and they will continue to return to the same nest each day to lay. If the nesting site your chickens have chosen is not convenient for you, simply remove all the eggs each day and they will choose another spot.

If you do opt for an enclosed hen house, there are a few things you should know. First of all, the beauty of a hen house is that chickens are creatures of habit. If you keep them locked up inside the hen house for a few weeks it will become their “home” and they will always return to it to sleep and lay their eggs. After the “training period” you can open the coop door and let them wander all over the farm, foraging bugs, and fertilizing before returning to their little home each evening. The convenience of this arrangement is that their eggs will always be within easy reach and the chickens will not be as vulnerable to predators at night. It also makes things much more simple on those rare occasions when you actually need to do things to your chickens, such as clip their wings or claws (both optional procedures). Chickens can be caught and handled quite easily when they are “roosting” (asleep) at night and so this is the time for such tasks. Trying to catch chickens in the broad daylight is often futile and only serves to stress them out, which reduces egg production.

If you are planning to build a chicken house, I would strongly suggest that you construct it in such a way that the nest boxes and feeders/waterers are accessible from the outside. This

arrangement prevents you from having to walk in all the poop and dust which accumulates at an amazing rate in a chicken house. The nest boxes can be situated at almost any height, but I have found 2 ½ to 4 feet to be a happy compromise between ease of egg gathering and comfort for the chickens. It is Murphy’s law that you will always have a few rogue hens who will lay their eggs on the ground, and so it is good to have a solid board of some kind placed directly below the nest boxes, preventing their access to the area directly below the nest boxes.

Your nest boxes should be filled with something that will keep the eggs clean and protectively cushioned. Most people use straw or hay for this purpose, but I have had much better luck using sand. The sand keeps the nest much drier than straw, which in turn keeps the eggs cleaner. It also stays to the bottom better, so there is less chance of breakage. Your chickens do not need to see inside of their nest boxes, and I have found that keeping them a bit dark (by using a fabric door flap) helps to cure egg picking.

A chicken house needs to be designed with plenty of ventilation because chickens are very vulnerable to respiratory ailments when they must breathe stagnant air. Constructing the off-wind side wall completely out of mesh helps a lot with this problem. Chickens are not terribly sensitive to cold, so leaving their house open on one side should not bother them, but in extremely cold climates you may have to take measures against frostbite on their feet and combs.

If you are planning to confine your chickens to an enclosed pen, you will most likely have to clip their wings to teach them not to fly over the top. Even with clipped wings, your fence should be a good six feet high (or more) because chickens fly much better than most people realize. In fact, it is not at all uncommon to see chickens

roosting on the farmhouse roof. Clipping a chickens wings, when properly done, will not harm them and the feathers soon grow back. If you clip both wings as far back as possible (so they can not fly at all) it will teach them that escape attempts are useless and you will probably never have to clip their wings again. Once in awhile, you will get a clever chicken who tests the fence after her wings have grown back. If this happens, catch her quickly and clip her wings again. If you don’t do this immediately she will teach the others her mutinous ways and before you know it you will be forced to clip the whole flock on a regular basis. One final note for the beginner: You do not need a rooster to get eggs—the hens will lay them either way. But you *do* need a rooster to get baby chicks. Borrowing a neighbors rooster for about two weeks will provide enough fertile eggs for a nest of baby chicks, but that may incite a few squabbles over pecking order.

**Ducks** are better than chickens when it comes to thriving in horrible weather, and are less vulnerable to predators since they don’t roost (or sleep) at night. They are also wonderful year-round egg layers. In fact, egg-bred ducks consistently outperform chickens in this regard—a distinction that few people are aware of. Ducks are not as efficient as chickens at converting feed to meat and eggs, and so are a bit more costly to raise. They are also more messy, but make up for this by being such wonderful natural parents. Since ducks do not roost at night like chickens or herd like geese, catching them can be a real adventure. Requiring them to walk into an enclosed small pen to access some grain each evening is effort well spent when it comes time to grab one. This also is handy when you want to gather their eggs - just shut the gate and leave them there until early afternoon when the eggs have all been laid. Like geese, ducks do not need a body of water to swim in. A simple bucket or

dishpan will meet their requirements, but a child's wading pool will provide them (and you) with hours of amusement. Just be sure and situate it so that it is easy to rinse out and refill, because you will be doing this often.

**Sheep:** Providing perhaps the greatest array of products for the least expense in feed, sheep are an excellent choice for the homestead. They provide meat, bone (buttons, small tools), milk (soap/skincare/paint ingredients/food/beverage), pelts, leather, wool, gut (string), and lanolin (water repellent/skin care ingredient). They also can be trained as beasts of burden for pulling carts and packing small loads. I once saw a full sized carriage being pulled by eight stout sheep. Better yet, the sheep were all wearing hats. Although cattle provide many of the same benefits as sheep, their size, strength, and reproductive limitations make them less practical for the small homestead. In fact, out of all the large meat animals, sheep are the easiest and safest to work with. They are easily trained to come when called, and can be moved around quite easily using only your voice and presence. This is better for the sheep, too, as it stresses them less than a herding dog would.

Sheep are very predictable animals, and once you learn their particular idiosyncrasies you can make them do almost anything. One example of this is that because sheep do not see very well, a shadow on the ground can be mistaken for a ditch or a stream. Using shadows, then (cast by sheets thrown over the fence) is a handy way of being able to influence which path a sheep will take. Sheep also move away from darkness and toward light, away from movements or noises, toward other sheep, and tend to bunch up in corners. Understanding these and other tendencies can make working with sheep a relatively simple task.

Sheep are another grazing animal, so their food is easy to come by in any season. They will fatten on grass

alone, and have one of the lowest nutrition requirements of all domestic ruminants. Sheep are easily contained, very quiet, gentle enough to be worked by older children, have minimal care requirements, and do not jump, climb, dig, tear, or chew their way out of pens like their Caprine cousins (goats) do.

Nowhere else in livestock will you find a greater diversity among breeds than in sheep. There are breeds that have no wool at all—only short hair, and breeds with wool so long it drags on the ground. There are sheep which produce dairy-quality milk in abundance, sheep which produce whole litters of lambs rather than singles or twins. There are stupid sheep, clever sheep, tiny sheep (60 lbs.) and tremendous sheep (300 lbs.), and the list goes on and on. With such mind-bending diversity available in this lone animal, there is undoubtedly a breed suited to your personal needs and preferences.

One note of caution: If you have a lot of potential hazards on your property that can't be fixed, don't pick a stupid sheep. A primitive breed (Mouflon, Romanov, Jacobs, etc.) will be better able to figure their way out of a problem situation. Case in point: I've had many commercial meat breeds manage to get their heads irreversibly stuck in the fence mesh, but never have had a primitive breed do this. Something to consider.

If you have decided to go with sheep, you won't need to buy a lot of special equipment for them. They appreciate a roof over their heads from time to time, but can also find decent shelter in a grove of trees. An assortment of small pens or portable panels are handy for moving and working with sheep, and for providing newborns with a private place to get to know mom for the first few days. Young lambs should have some place to get out of heavy rain, and newborns require a draft-free area in winter months. It is nice to have some bottles and feeding tubes around for weak or excess lambs. Milk replacer that is

specifically formulated for sheep is a wonderful and worthwhile convenience, but not essential as you can always milk your ewes or other dairy animals.

Sheep are great wasters of hay if it is not kept up off the ground, so you'll want some type of hay feeder. Do NOT use hay nets for this purpose, as they are like magnets to lambs with suicidal tendencies. You'll want some iodine for the lambs' navels, a castration device for your ram lambs (not essential, but makes management much simpler), and some goat-style hoof trimmers. Like other hoofed stock, sheep need loose minerals available to them at all times. Many people keep some corn or other grain on hand for lactating ewes, although if your pasture is good and you breed late (Dec/Jan) this is not essential.

**Goats:** Whenever the word "homestead" gets mentioned, people think of dairy goats. And rightly so. Although a tad more difficult to manage and offering a bit less in product diversity than sheep, goats are still the most popular of all homestead hoofstock. Their inquisitive and comical personalities probably are what gained them this position, but their wonderful production qualities are what has kept them there.

While goats do provide most of the same products as sheep (meat, milk, leather, bone, horn, fiber, strength), they are best known for their milk. Despite its reputation, when properly handled, goat milk tastes just like cow's milk and most people can't tell the difference. That gamey, sour tasting stuff you buy in the store should not be confused with normal, home-grown goat milk. The store bought milk is processed differently, and often comes from goats bred for making cheese, since they generally have the highest production efficiency. The natural "tang" from a cheese-bred goat is not a flavor that most people prefer in their table milk, but the larger dairies go with what is the most profitable for them.



Many people reject the idea of dairy goats for their homestead because either they are allergic to milk, don't like the idea of being tied down to milking every day, or don't feel they could ever use the sheer quantity of milk that comes along with keeping your own dairy animal. Let me start by saying that goats are useful for things other than just producing milk meat. For one thing, goats are terrific at clearing brush. They will eat bushes, trees, weeds, sticks, poison oak, thistles, and anything else that gets in their way, but will not damage the grass. Many people buy goats just for clearing pastures. Goats are also very strong and easy to train. They can carry moderate loads on their backs and will also learn to pull carts and wagons. In the old days, people sometimes rode to town to do errands in their goat carts, and today many people use goats as pack animals. Photography buffs appreciate that wild deer can often be approached without frightening when accompanied by a goat. Goats also make wonderful companion animals, and will befriend a lonely horse (or anything else), and make excellent pets for children. Many goats will "adopt" other animals, and so can be used to raise orphaned lambs, calves, foals, and other livestock. These "orphaned" animals can often be gotten for free (or very little) from livestock auctions and farmers, so having a nanny goat around can be quite profitable. Long-haired goats provide the finest quality fiber for spinning and making into clothes (cashmere & angora are both produced by goats), and buck goats will fight off coyotes, within reason. Like all livestock, goats provide fertilizer for the garden, and let's not forget the most important thing goats can produce—baby goats!

As far as the objection due to a milk allergy goes, people who are allergic to milk & dairy products usually are not bothered at all by goat milk or goat's milk products. In fact, most of the people who own dairy goats got

started because they (or a family member) were allergic to milk. If you have an infant who is allergic to breast milk, cows milk, or is having trouble with formula, try goat's milk. It often provides a nutritious and inexpensive solution.

To answer the concern about having too much milk, I will tell you that everyone who owns a dairy animal thought this at one time. However, once you discover all the uses there are for milk, the problem becomes never having *enough*! That's one reason most goat owners end up buying several more goats. Goat milk is not just used for drinking. When you have an abundant quantity, you find that milk is handy for making soaps, cosmetics, and durable paints, great for removing stubborn odors from clothes (use it in your pre-wash), can dramatically cut the cost of feeding other homestead pets and livestock (milk-fed chickens taste superb), and the list goes on and on. Also it takes a lot more milk than you might think to make cheese. Depending on the type of cheese desired, it can take as much as two gallons of fresh milk to produce just one cup of cheese. Milk is also a great commodity for bartering. Once your friends and neighbors discover how delicious and healthy fresh goat milk can be, they will be calling you for a supply. Homegrown goat's milk usually sells for around \$5 a gallon these days, so extra milk can also provide a side income. In many places, pasteurization is required by law before milk can be sold to the public for drinking. It is simple enough to pasteurize the milk yourself (just heat it to 190 degrees), but most of your customers will want the milk left raw as it is much healthier for humans in its natural state. In this situation, simply label your milk "for pet use only" and don't ask questions about how they intend to use it.

Processing your milk into cheese is not as difficult or time consuming as people think. In fact, the part that takes the longest is letting it sit undis-

turbed. The actual work involved in cheesemaking only lasts for a few minutes at a time. The type and taste of the cheese depends on which culture you use, how you season it (salt, herbs, etc.), how long you let it sit, and whether or not you "age" it (leave it in the root cellar).

The setup for making cheese and other products does not require any major expense for equipment. While home dairying is a little bit easier with the proper tools and supplies, the things you already have laying around your house can make do—and pretty well, at that. Old plastic pitchers make satisfactory milking buckets, Clorox disinfects almost as well as dairy cleanser, garden shears make excellent hoof trimmers, coffee filters or cloth can be used to strain milk, and the most popular cheese press is still made out of a coffee can fitted with a wooden disk. If you want to be really proper and use all stainless steel or glass, your kitchen pots and pans, mixing bowls, and spoons and forks can do most everything necessary. The only item that is truly essential is a good dairy thermometer. If I were to suggest one more item to purchase for the home dairy, it would be a proper milk strainer with a supply of disposable filters.

Despite all the benefits a dairy goat provides, many people still rule them out because they don't want to be tied down to the chore of milking every day. While it is true that a doe in full lactation does need to be milked once or twice daily, there are creative ways of accommodating this that do not involve *you*. Personally, I always try to keep around some nursing lambs, puppies, kids, calves, etc. who can take over the chore if I'm not going to be home. This requires an obliging goat of course, but they are not too hard to train. The best breeds for accepting stray infants seem to be Toggenburgs, LaManchas, and Angoras. Neighbors and other goat keepers are surprisingly willing helpers, too, since they usually are

happy to do the milking occasionally in exchange for the milk they receive. Another factor is that dairy goats do not always need to be milked regularly. How the goat regulates her production is up to you. You can keep a goat in production all year, or just for a few months, or not at all. And the amount of milk she gives can also be regulated according to your personal needs by varying your feeding program or the time period between milkings.

If you are planning on customizing your goat's milk production, I would recommend choosing an individual from one of the Swiss breeds who was bred for a long lactation cycle, and avoiding Nubians altogether. Nubians are very sensitive to changes in their upkeep and will tend to dry up on you if they are tampered with too radically, whereas a goat bred to have a long lactation cycle is often difficult to dry up, even if trying. It is this quality that makes a goat more agreeable to changes in their production output.

Goats are famous for getting out of pens and that reputation is well earned, but you can keep them confined quite easily if you simply realize that: (a) goats love to climb, (b) goats love to jump, (c) goats love to squeeze under things, and (d) goats love to eat most common building materials. This may make keeping goats confined sound like a difficult task, but problems only arise when people don't consider their goats natural "Houdini" talents. Very effective pens can be built out of woven wire, chain link, solid wood, picket type fencing, or horse panels. The best goat pen I ever had was built out of old wooden pallets that I got for free. Most goats will stay in a three and a half foot fence, and all goats will bother your fence less if they have plenty of room, and something fun to climb on inside the pen, such as a wooden spool, some logs, or an old truck tire. If you're still worried about fencing, you might consider one of the breeds with less of an inclination to escape, such as Toggenburgs.

Goats do require more protein in their diet than sheep or other ruminants, so you will need to keep them on a comparatively rich diet. Alfalfa or clover hay, leafy brush, and legumes such as soybeans work fine for this. Grain is frequently fed for optimum milk production. Unlike sheep, goats are browsers rather than grazers, meaning that most of their diet consists of the richer foods, such as broad leafed weeds and tree leaves. For this reason, you can not expect a goat to stay content in a pasture filled with grass alone.

**Pigs:** Because of their size, strength, and characteristic odor, pigs are not an animal that I am inclined to recommend as the first choice for a beginner. Better to start with something like rabbits or chickens. But pigs are so practical that I would be cheating you if I did not at least give them a mention. Like chickens, pigs will eat almost anything. God has designed the pig to excel at this, by giving it a physiology that compensates for unorthodox feeding. When fed insufficiently, pigs will be just as healthy, prolific, and content as properly fed pigs—they will just be smaller. Because of this, you can responsibly raise a pig on pretty much whatever you have a surplus of. You can also let them roam free and fatten on your pasture, but this method requires you to fence them out of other areas, such as your garden and chicken coop (they will eat small animals). This ease of feeding, coupled with their large litter size and minimal space requirements are what has made keeping pigs one of the staples of homestead living. Pigs are year-round breeders, who give birth to some 8 to 14 babies per litter, sometimes even more. They provide meat, bone, a tough and versatile hide, and a great quantity of useful fat. Although pigs are capable of inflicting fatal injuries on humans, they are normally very docile and affectionate creatures if raised properly. In fact, pigs (who are highly intelligent) can be trained as beasts of burden, hunting

companions (scent), or reliable guard animals.

Because pigs do not have sweat glands, they must regulate their body temperature by keeping wet during hot weather. Often the only "wet" spot a pig can find is a pool of mud. The resulting necessity of "rolling in the mud" has led to the image of pigs as dirty animals, when in fact they are very clean animals if given access to streams or other renewable sources of water.

Pigs are outrageously strong animals, so strong that they can root your fence posts right out of the ground. This quality makes them very difficult to keep confined. To fence pigs either in or out of an area requires very stout fencing that is solid all the way down to the ground. If they can get their mighty snouts underneath any part of it, they will pull it up and out of their way with a lack of effort that will astonish you. Electric fencing works tolerably well for pigs when it is strung in several levels, beginning close to the ground. Concrete block and steel rail fencing posted in cement are both used frequently. Putting a ring through a pig's nose will solve the problem of digging under fences, but unfortunately will prevent them from foraging food, too. A happy (meaning well-fed) pig is usually content to stay in its pen once it has reached adulthood, so the trouble of confining a pig is at least short-lived.

The only other drawback to keeping pigs is that they are difficult to restrain bodily for vet care or routine management, so some skills in this area will need to be acquired before the beginner can safely handle them. Pigs are also capable of exchanging certain illnesses with humans (they can catch your cold, and visa versa) whereas most other animals are not.

## **Practical advice**

Well, that concludes my discussion of practical homestead animals. I feel obligated to add a few thoughts on

disease control because the vast quantity of books out there frighten many people with their warnings about disinfecting everything from your cages and pens to your boots and feed tubs. What you need to realize is that the majority of books available on livestock care were written with the large commercial operation in mind, or were based on the information found in such books.

In a homestead situation, you are keeping only a few animals and they are not subjected to the overcrowding, horribly filthy conditions, high turnover, and stresses associated with commercial establishments.

Because of this, you don't need to worry about disinfecting everything your animal comes into contact with any more than you would worry about disinfecting your children's hairbrush and schoolbooks every day, or spraying down the walls of their bedrooms. A healthy animal's immune system will keep them from getting sick from the germs commonly found in their surroundings, and through constant contact will actually build up a resistance to the illnesses.

There are, of course, exceptions. Occasional disinfecting of pens and cages is good management, and specific contagious ailments will sometimes get into your livestock that do need to be carefully controlled and prevented from spreading. These specifics will be addressed in the various livestock books, but for now, simply know that any area that is clean enough for you to be comfortable in is probably clean enough for your animals. If you keep the accumulated poop to a minimum, have fresh food, water, and dry bedding available, and a roomy well-ventilated area for them to live in, you should not need to worry about constant disinfecting.

A word of wisdom: Don't try to get all your animals at once. It takes some time to become proficient in most husbandry skills, and Murphy's law dictates that sometimes everything will go wrong at once. When this happens,

it is best if you are experienced enough with your animals to be able to do things quickly. Speed comes from practice, and so it is best to limit your animal varieties until you have had time to gain some level of proficiency in each one. I have been keeping animals for over 30 years. Once I went on a vacation overseas and left my farm in the care of a young couple who loved animals but had very little experience. I left them a detailed list of my normal routine, and walked them through everything the day before I left. My normal daily livestock chores took me about three hours. After a week in Europe, I phoned home to see how things were going. The young wife told me that she was slaving all day long, and her husband had had to quit his job to help her because there were not enough hours in the day to keep up with everything. For me, this same load had taken three hours. I relate this true story to make a point: People who fill their whole farm with new critters are often unprepared for what can happen when the work load is suddenly shifted because an animal gets sick or injured, or escapes, or gives birth, or some other very common occurrence. Please be kind to your animals and yourself by not biting off more than you may be able to chew. Animal skills are not acquired overnight.

When researching breeds, *do not* overlook the minor breeds. These are the heirloom foundation stock that today's commercial production ani-

mals descended from. As a group, they are much more hardy, and are generally better suited to the needs of a small homestead.

Today's industrial livestock breeds were carefully engineered to deliver the greatest possible production yield in a carefully controlled environment, but in achieving this goal, the natural stamina and vigor had to be sacrificed due to excessive inbreeding. This is one reason why commercial farms of today keep all their animals on maintenance antibiotics. Many of the modern breeds have brittle bones, low fertility, birthing problems, poor maternal instincts, respiratory and organ weakness, poor foraging ability, and little resistance to diseases and parasites.

The traditional heirloom breeds, however, are the same as they were when our great grandparents depended on them for life. This is why most savvy homesteaders are going back to the minor breeds when choosing livestock. This just might be a good idea for you, too.

For more information, consult the various livestock associations and clubs as well as a number of books, and talk to as many experienced stockman as you can. Since there are as many successful methods for keeping livestock as there are successful livestock keepers, gather an abundance of information and then pick and choose those techniques which are best suited to your lifestyle. **Δ**

### If you enjoyed Amelia Porter's animal advice

you can find more of it in [\*Boston on Surviving Y2K and Other Lovely Disasters\*](#) from Javelin Press. She wrote chapter 18, a 44-page guide on choosing livestock for a survival crisis. The book has been cited by reviewers as the best disaster preparedness book on the market, exhaustively covering everything from generators to dental health in an informative yet engaging style. The author provides thorough research about all of the products and procedures one might need to become entirely self-sufficient. Phone numbers and resource lists are also included. This excellent book retails for \$22, plus \$3 S&H, but you can order a copy directly from Amelia Porter for only \$17, plus \$3 S&H, or two for \$32, plus \$3 S&H, by writing to her at P.O. Box 31M, Ignacio, CO 81137. To get this special price, make checks and money orders (or send cash) to Amelia Porter. No credit cards. Amelia's special discount for *Backwoods Home* readers will allow you to purchase any of the Javelin Press books for \$3 off the retail price when you mention her name and this article. You can visit the Javelin Press website at: [www.javelinpress.com](http://www.javelinpress.com) to learn more about this and other Javelin titles.





## *Reflecting on a life in the woods, and* **LOOKING AHEAD**

*By Marjorie Burris*

**I**t is a good life here on the old homestead. We've worked hard, and we are enjoying the fruits of our labor. It was tough digging the holes in our hard, rocky ground to set our six solar panels, but they make enough electricity to power lights and a big refrigerator with a freezer. It has taken years, but we've finally worked enough humus into our sticky clay garden to make some lovely friable

loam. And it took a lot of pruning and fertilizing, but we've managed to revitalize our 100-year old orchard to the point where it bears bushels of some of the tastiest apples we've ever eaten. Now, another harvest season has almost passed, and the cozy snowed-in days of winter are coming.

We haven't done haphazardly what we now enjoy; we've planned all along the way, and planning for the years ahead will make these coming years fruitful too. In planning, we divide our jobs into three catagories:

**1.** Those jobs which are necessary for our survival, such as plant a garden, cut firewood before the snow piles up, clean the stovepipe, and cut the weeds around the house that harbor rattlers.

**2.** Those jobs which help to make us comfortable, such as add to our solar system, perfect our water system, finish building our new house.

**3.** Those jobs which enhance the property, such as replace some of our old apple trees, add to our irrigation system, paint the barn.

When we think of the jobs to be done in the light of these priorities, it is easier to decide where to start first, and how much effort we need to apply to get the job done. Husband and I are both eager to finish our new house, but because it is a second priority job, we know it will be at least another year in the building. Our old log house, about 1903 vintage, is a roof over our heads, but that roof is getting very leaky and just a little patch up work here and there won't do anymore. We need to tear the whole roof off and start over, but that isn't wise as long as the foundation is settling into non-existence. That leaves us at the beginning of a house, which meant a new beginning on another house was the better choice. In the new house we are installing propane heat, with a wood-heating stove as a back-up. We are getting too old to cut the 17 cords of firewood we need every year to heat and cook with in the old house. Our concession to fossil fuel heat was a necessity brought on by old age. It was either make our life easier here or move to town. We couldn't bear the thought of going to town.

Planning has helped us to take into account our age and energies, then to prompt us to get up and do more than wishful thinking.

We are grateful we have been able to live a simpler life here in the backwoods. I've noticed how our sense of values has changed over the years. I no longer see a woman's big diamond ring, or a man's hand tailored suit, or the fancy car they drive. Frankly, those things don't interest me. But I do appreciate a bone-warming fire on a cold winter day, a drink of pure water from our spring, the juicy tomato just picked out of the garden.

We no longer even want to go to a movie or a play; it is more entertaining to sit on the front porch and watch the animals, both wild and tame, play. Animals play? Yes, they do. Even the birds play. We didn't know this until

we lived in a place where we could watch them.

For us, it would be a waste of time to go to a gallery to see painted landscape scenes. Every morning we get up and look out our front window on one of the prettiest scenes imaginable. The almost vertical, rocky sides of a mesa rise up on three sides of us, enclosing us in a box canyon. Trees, pines, junipers, oaks, walnuts, box elder, with leaves of every hue of green, dot the cliffs, softening the steepness with their branches. When the first rays of the rising sun touch the trees and the rocks, they turn everything a rich, breathtaking gold. In the evening the setting sun filters through the trees, back lighting them, making them throw longer and longer shadows. In the winter, snow makes a christmas card of it all.

Also, Husband and I have learned to appreciate one another more fully. Living as we do, we depend on one another much more than we ever did in the city. Our tasks compliment one another. I cook, he feeds the cows. I sew, he saws the boards. I hoe the garden, he runs the backhoe. It takes us both to get in our supply of winter wood. It takes us both to lift the big rocks we need to build a wall.

And it takes us both to put up the siding on the walls of our new house. Not to mention, we keep track of one another's welfare; so many accidents can happen with our active lifestyle, it is comforting to know that someone who cares is about to check on you.

We appreciate our surroundings, our home, our companionship. Whatever happens in the future, we will always have the sweet memories of our present life.

We would have an empty feeling if we thought all our work on this old place was for the benefit of only the two of us. Through the years we have learned how to do so many things the "old timey" way and most of it had been learned through trial and error, tears and frustration. We don't want

those old ways, and especially the old attitudes, to be lost in time. We want to share what we have learned, what we have accomplished.

Fortunately, our three sons and their families are interested in taking up where we will leave off. But it is not just family we have thought about. When we were younger and up to the emotional challenge, we would take other boys into our home for a summer, boys who needed to be away from the influence of a city gang, or who were becoming rebellious at home. Almost always, at the end of the summer a counselor or a psychologist would call us and tell us what a difference they saw in a boy after he had lived awhile on the old homestead. We think it is the "can do" attitude the boys developed after being in a rustic, remote place where they were encouraged to fix machinery, mend fence, build a shed out of materials at hand, and using their own ideas. Now, our own children are bringing their children to the homestead to learn the same things.

We don't know whether these young ones will ever live in the country or not, but if they feel capable and confident, they will do well wherever they decide to live. This, we hope, is our legacy.

I'm looking forward to the year 2000—there's so much yet to do. Robert Frost, the New England poet who wrote about simple country things, must have felt the same way when he wrote the poem "Stopping by Woods on a Snowy Evening." The first part of the poem tells about an evening when he was riding his horse home through the woods and it began to snow. It was so lovely, he had to stop awhile and watch the snow as it piled up on the tree branches. But in the last stanza of the poem he explains why he goes on:

**The woods are lovely, dark and deep,  
But I have promises to keep,  
And miles to go before I sleep,  
And miles to go before I sleep. Δ**



# **MEDICAL KITS**

*for self-reliant families*

**By Jackie Clay**

**T**here may be a time, as close as tomorrow, when your loved ones need medication or medical treatment and there is no drug store open or doctor available. This may be as simple a situation as a head cold coming on during a weekend night, or more drastic, such as nothing available after a civil or natural disaster.

## **Family medical kits**

Here at home, we've always had a medical kit. Several, in fact. One is quite large, made up of a poly box, originally designed as a field box for trap and skeet shooters. This "drug store on wheels" is a well-packed medical utility box that will handle nearly everything from a cold to

severe lacerations. This one we carry when traveling in remote locations.

But while it is loaded with most medical needs, far surpassing a first-aid "kit," it is heavy, weighing over 30 pounds, and it is not something we carry for short trips, pack in our canoe, or carry on horseback.

An intermediate kit is lighter and fits into a flat, moderate-sized fishing tackle box. While this does not contain such a wide variety of medical supplies and medications, it is a very well thought out first-aid—and then some—medical kit. This is light enough to pack in the canoe (if we don't foresee many lengthy portages, when every ounce counts), with camp supplies on a horse packing trip, or small enough to take up little room in the truck.

Besides this kit, we also carry a small first aid kit under the seat of the

truck and Suburban, containing bandages, antibiotic ointment, burn medication, sterile gauze, tweezers, aspirin, sterile eye wash, and cold tablets for ourselves and our eight-year-old son, David. In the glove box is a smaller snap-open plastic box with Bob's oral diabetes medication, my blood pressure pills, and a few aspirin. This has come in handy many times when someone forgot to take prescribed daily medication or a headache suddenly popped up. As the glove box does get hot during the summer, this small stash of meds is rotated routinely to make sure the strength does not fade.

## **Learning to use your kit**

No matter how comprehensive your medical kit is it can be useless or even harmful if you do not know how to use it safely. You don't have to have



## **SUGGESTIONS FOR YOUR MEDICAL KIT (LARGE)**

ITEMS	USES
thermometer	detecting fever
aspirin/Tylenol	fever/pain
zinc lozenges	head off colds/flu
cough/throat lozenges	comfort with colds
antifungal medication	fungus infections of the skin
antibiotic ointment	heal cuts/abrasions
eye medication	infections/irritations
oral expectorant	clear lungs, reduce coughing
burn medication, such as Burn Free	reduce severity and pain from burns
oral electrolytes	treats dehydration
rolls of 2" sterile gauze	covers wounds, control bleeding
several packs 2" sterile pads	covers wounds, gauze controls bleeding, holds medication in place
rolls of elastic leg wrap	supports sprains, holds meds in place controls bleeding, protects legs
rolls of sterile cotton	cleaning area, controls bleeding, etc.
alcohol, soap, Betadine	cleaning, disinfection, wound healing
oral antidiarrheals	treating moderate diarrhea
any family daily meds	maintaining health
oral antibiotics/sulfas	treating systemic or local infection
injectable antibiotics/sulfas	treating systemic or local infection
injectable ephinephrine	shock, as in drug allergy
injectable antihistimine	allergies; bee sting
surgical instruments, such as	facilitate minor surgery
forceps, needle holder,	
scalpel w/blades, scissors, etc.	
assorted sizes suture material;	allows suturing of gaping wounds
absorbable	
stethoscope	monitoring vital signs
sterile needles and syringes	giving injections
sterile IV kit (if experienced)	makes IV injections possible for severe dehydration
IV electrolytes	severe dehydration, shock
first-aid manual	instructions

**Of course your family's personal medical kits (small, medium, and large) will probably contain different items, depending on your foreseeable needs, medical experience, and preferences. And you will probably think of many more items that would be provident to carry, especially in your large kit. There are no hard and fast rules, only suggestions. The main thing is to be prepared-and confident.**

extensive medical treatment to handle most emergencies that occur in real life. Most of ours consist of splinters, minor cuts and scrapes, sprains, and an occasional head cold or the flu. While these are scarcely life-threatening, they are uncomfortable and the afflicted party sure appreciates quick, competent aid.

Our family is lucky; I have spent a lifetime as a veterinary field technician riding on calls and acting as an assistant on everything from broken

legs to pneumonia. Bob is a Certified Nurses Assistant (CNA) with additional military medical training in Vietnam.

But you'd be surprised at how much free medical training is out there for you to pick up. Many communities provide first-aid classes, including invaluable cardiopulmonary resuscitation (CPR) training.

During these classes, ask questions to boot up the amount of knowledge you receive. Attend volunteer fire-

men's training sessions, as available (again, ask around). Ask your veterinarian if you could accompany him/her on calls one or more days a week free in exchange for the knowledge you gain. Yep, I know, they're animals, not people, but basically, a mammal is a mammal, especially when it comes to shock, wounds, and common illnesses such as pneumonia.

Pick up a good first-aid manual (which should be in your large medical kit at all times) and a book or two

from a preparedness company which details medical treatment when no doctor or dentist is available. Then *read* these manuals carefully. I know they're not great reading, but they can save someone's life. Share the reading with your spouse or older children, and even practice at home. It can be interesting, learning to suture gaping wounds on a piece of that chicken you're having for dinner. After it's butchered and ready to cook, of course. I'm not that morbid.

### **Real life medical treatment basics**

While some survival first aid manuals assume your family's injuries will need treatment for nuclear blast and gaping wounds, in reality most will be of a much more mundane level no matter where you are, from arctic tundra to urban sprawl. They will consist of minor cuts, scrapes, slivers, blisters, the flu, colds, a fish hook in the skin, etc. We have lived for years in very remote locations and, although the worst injury any of us sustained was Bob's green stick fracture of his leg in a snowmobile accident, the most painful was my severely sprained ankle, suffered when I missed a step going downstairs in our farmhouse in "civilization."

Let's look at some real-life possibilities and what to do about them, assuming that there is no doctor or hospital available. Remember that if trained medical help is available, one should always consider this course first as many conditions can be made worse by incorrect diagnosis and treatment.

### **Hypothermia**

Believe it or not, hypothermia (the condition where the body temperature is lowered below normal) kills more people in survival/stress situations than does gunfire, wild animal attacks, poisonous reptiles and spiders, wounds, or drowning.



The large medical kit is portable. We carry it on all remote trips.

Hypothermia has many causes, from shock following an accident to remaining outside in cold weather without adequate clothing or shelter to getting dunked in icy water—even for short periods of time. It is definitely something to watch for in any survival situation.

Identifying hypothermia can be a problem with the uninitiated, as it comes on slowly and the person still can walk and talk. But by paying careful attention, one can usually notice body shaking, paleness, and a tendency toward poor judgement and/or speech that doesn't make sense.

Taking the victim's temperature, you will quickly see that it is subnormal.

Hypothermia must be treated vigorously and immediately. Warmth is the key. As the body has lost its ability to warm itself, simply putting a blanket around the person is not enough. Build a warm fire. If the victim is wet, get them into warm dry clothes quickly. Warm a blanket or sleeping bag, then wrap it around them while they sit or lie in front of the fire. If they are not too bad, a drink of warm coffee or tea often helps. But do not give anything

to eat or drink to a victim that is dazed or unconscious.

If nothing else is available, have one or more persons crawl into a sleeping bag or blankets to provide bodily warmth to the victim. Then keep the person warm and dry until they are fully recovered. You don't have to be a mountaineer to suffer hypothermia. I have had several encounters: falling through thin ice while crossing a beaver dam, getting stuck out in an unexpected blizzard in June, and getting drenched in the rain while making a mile and a half canoe portage in Minnesota's Boundary Waters. Hypothermia can be just plain uncomfortably miserable, but it can also kill.

### **Wounds**

Most wounds that folks suffer in a survival situation are relatively minor, and though they may be uncomfortable and even bleeding, they are not usually life-threatening. The thing is not to panic. A little blood looks like a lot, especially when it is on yourself or a loved one.

If the wound is combined with possible other injuries, such as following a tumble down a rocky slope, you have to first assess the possible dam-



Our medical kit comes in handy in daily life, from cuts to colds.

age. Could there be a broken bone? A concussion? Internal injuries?

Don't panic. However, if you suspect such complications, do not move the injured party unless absolutely necessary, and then do it with great care.

Talk to the victim. He can usually tell you a lot about where he hurts and how much pain he is in. If the only injury seems to be the wound, reassure the victim and begin treatment.

Check the wound. Is it visibly dirty? Is the blood simply flowing from the wound or is it spurting? In survival situations, more people die from infected wounds than bleeding to death.

If the wound is relatively minor and the bleeding is minimal, you'll want to gently clean it before any attempt is made to bandage it. Nothing causes infection more than bandaging an unclean wound, even if it contains no visible dirt. Remember that deadly staph organisms are commonly found on human skin.

A good way to clean most wounds is to gently bathe the area with mild soap and water. Mop away from the wound, as one would sweep a floor, instead of scrubbing back and forth. The latter only moves bacteria around

rather than removing it from the area. Rinse or soak the area well, removing any debris carefully with sterile tweezers.

When the area is clean, pat it dry with sterile gauze or air-dry it, then apply Betadine or antibiotic salve. We use Betadine for deeper wounds, and antibiotic salve for lesser injuries. Minor wounds seldom require bandaging, healing quicker by air exposure. Deeper wounds and ones in areas where they will be constantly irritated by clothing or work should be bandaged. A simple adhesive strip usually does the trick.

If the wound is bleeding quite a bit, simply applying pressure to the area with a sterile gauze pad will usually stop it within a few minutes. Where tourniquets were once advised, it has been found that more damage was done by the tourniquet than the bleeding would have caused in most instances. The application of firm pressure directly to the wound is very effective. After the severe bleeding has been stopped, gently clean the wound, but do not destroy the clot that has formed or bleeding will probably resume.

Should you be dealing with a more severe wound, covering it with a

Betadine soaked (but not wet) sterile gauze, then a plain sterile gauze square, then adhesive tape is usually sufficient. If the edges of the wound gape or there is a flap of skin hanging down, either gently match the edges with butterfly adhesive strips or suture them, if you have the experience. Remember that most wounds will heal fine without suturing, especially with a little help from gentle butterfly adhesive strips. Sutures that are too tightly drawn will cause pain and scarring.

Never bandage a wound tightly with gauze bandage or anything else. This will restrict circulation and can cause pain and severe problems and even gangrene.

In the following days, keep the wound clean and dry. Change the dressing as needed, usually twice a day, leaving the dressing off and the area open to fresh air and sunlight as much as possible. This will greatly reduce the healing time and reduce chances of infection. Bacteria love damp, dark, warm areas, including a wound which is bandaged.

Watch for ugly redness or a fever in the patient, which would indicate infection in the wound. In this case, keep the area soaked in Betadine and give the patient antibiotics for 10 days, even if they seem better within a day or two. Immersing the infected wound in a hot Epsom salts solution also helps reduce pain and swelling along with cleansing the area.

Simple pain and swelling from the injury can be alleviated by plain aspirin, taken orally. Do not give aspirin immediately following an injury if there is a possibility of internal injuries, as aspirin may enhance hemorrhage. Do not give aspirin to young children. Use Ibuprofen instead.

### ***Colds and flu***

These common conditions are bad enough when things are fine, but are downright miserable in a survival situ-



ation. And remember that stress helps these overcome your body.

At the first sign of a cold or the flu, do those things your grandmother told you: keep warm and dry, rest, and drink plenty of fluids. Then add vitamin C and zinc lozenges, and most folks can overcome that mean cold or flu in a few days. If you need to alleviate symptoms, such as fever, runny nose, or coughing, take a cold/flu medication that covers your symptoms. By now, you probably know what works best for you and your children. The key is to have the medication on hand.

If the cold or flu lasts for longer than 10 days or seems to get worse, it may have turned into bronchitis or pneumonia, and antibiotics are necessary. Remember that home treatment is only for when no doctor or hospital is available.

## **Sprains**

Believe it or not, sprains are one of the most common injuries in a survival situation. And often one of the most painful. The sprain can arise from walking over debris, logs, rocks, and even urban curbs. It can come from a fall or even an ankle turning over. (Your family will experience less sprains if they wear good, sturdy footwear, not flats or sandals. Ankle support is very important.)

When a sprain is new, immerse the affected part in cold water or apply ice packs to reduce pain and inflammation. I've found that when I take two plain aspirin immediately following such an injury that it greatly reduces both pain and inflammation later on.

If possible, rest the sprain, keeping it immobile and elevated for as long as reasonably possible. I continue taking the aspirin to keep down the inflammation. If you must move about, gently wrap the area with an elastic bandage to support it. Do not wrap area tightly or you will restrict circulation and make the pain much worse. Use a cane or crutches if the sprain is in a

foot, ankle, or knee to reduce the amount of weight put on the injury. If the sprain is in the hand, wrist, elbow, or shoulder, keeping the arm in a sling will greatly reduce the pain and help it heal.

After a day, begin using hot Epsom salts soaks or packs to reduce the swelling and pain. And remember, the more you use a sprained joint, the longer it will take to heal and it may not ever heal completely if you persist using it before it heals. Rest is the key.

## **Slivers and spines**

Getting a sliver or sticker of some kind is awfully common, especially in a survival situation, when one may be building a wood fire or foraging for food. Most of the time you can simply get hold of it and pull it out and be no worse for wear. But sometimes it is in too deep and painful and seemingly impossible to remove.

For relatively minor, but painful slivers, I use a sterile hypodermic needle, choosing the gauge (diameter/size) to fit the sliver size. Most smaller slivers are removed very easily with a 20-gauge needle. Now I use a hypodermic needle for several reasons, as opposed to using a sewing needle. First, and most important, they are hollow. This allows one to slip them into the sliver track with little pain, as less bulk is pressing on that tender skin. They are also sharp, which lets me carefully pick away the skin layer above the sliver which has no feeling because there are no nerves, until the sliver is exposed and can be either snagged with the needle and drawn out or picked up with a pair of sterile tweezers and removed.

With larger slivers, I use an 18-gauge needle, which does the same thing but is a bit stronger. When the sliver is very painful, using a local anesthetic, such as oral medication or antibiotic ointment containing an anesthetic on the area about 10 minutes before the procedure, helps a lot.

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The main thing is to keep the sliver aligned with its track, and not to pry it upright in removal, which is extremely painful.

Once the sliver is out, a little alcohol or Betadine will disinfect the area and let it heal quickly.

I've discovered a great treatment for small stickers and cactus thorns which break off when you try to remove them from tender skin. Should you or a family member fall into a cactus or other plant with fine stickers, simply coat the area with Shoe-Goo or Sportsman's-Goo, which is a clear silicone-type produce. Just a thin coat is fine. In about fifteen minutes it will be dry, and you can just peel it off, complete with all of the painful stickers.

Of course, there are many other possible injuries and illnesses. With a little advance preparation and study, you'll be surprised at what you can glide smoothly through. There is seldom any benefit to panic; a positive mental outlook can save lives. Δ

# Tips and tricks for the kitchen

By Richard Blunt

**T**he warmest and most interactive place in my mom's home was her kitchen. Cooking was her favorite pastime and her kitchen was a place she could relax and enjoy herself. There she entertained friends and neighbors, helped me with my homework, and even read her favorite mystery novels. Many of the subjects I write about are based on the many wonderful hours I spent in her kitchen, watching her perform her culinary magic on all kinds of foods. I grew up believing a kitchen is a place to enjoy yourself while being creative. Mom taught me that if I understood the basics and knew what I was doing at all times, cooking would be easier, faster, and more enjoyable. This is true even when you're working with foods and preparation methods that are new and unfamiliar.

Since I started writing for *Backwoods Home Magazine* I've spent a great deal of time talking with other people about their kitchen adventures. Along with their many culinary triumphs, folks share with me the problems they've encountered while trying to prepare their favorite foods and beverages. Most of the problems are minor but, when uncorrected, they can lead to wasted food and possible embarrassment in front of guests or family. For many cooks these problems lead to frustration with an environment that they eventually perceive as being more like a minefield than a kitchen.

As I read through my notes to recall some of these woeful tales of culinary disaster, I realize that most of these problems could be avoided by "knowing your basics," as my Mom would put it. As an example, a close friend came to ask my advice one day. She loves Asian foods and loves to prepare many of the classic dishes, especially those from Thailand and southern India. But she couldn't cook the delicate long grain Basmati and Jasmine rices, an integral part of many Asian cuisines, without having the individual grains split and curl at the ends. The rice tasted fine but the split and curled ends detracted from the presentation of these otherwise magnificent dishes. I told her to soak this kind of rice in cold water for 30 minutes before cooking it, and her problem was solved.

But it isn't just techniques that can make your time in the kitchen more enjoyable. Many labor-intensive or difficult kitchen tasks can be performed more easily if you use a piece of equipment specifically designed for the task at hand. An example occurred the day my son's hockey coach tried to shred a nutmeg berry with a paring knife. On the



**Richard Blunt**

way to the hospital to get his finger stitched he complained, "Why don't they invent something to make that job easier?"

Simple problems like these can frustrate anyone and make their kitchen seem like a war zone. What he didn't know is that there are nutmeg graters which are easy to use, safe, and available in most food stores. This is how I grate nutmeg. Of course, a nutmeg grater may not be practical for someone who uses it just once a year on New Year's Eve to grate nutmeg for eggnog, but if you use fresh nutmeg frequently, it is a practical and almost indispensable tool.

During the 25 years I've been a professional cook I've employed many simple techniques, procedures, and tools to help make my experiences in the kitchen more enjoyable. In this and the next column I'm going to share with you some of the preparation techniques, special equipment, and general knowledge that I use in my kitchen. Some of the information, and a couple of the recipes, are taken from some of my earlier articles. I have included them here because they're working examples that demonstrate the benefits of knowing and using basic rules of culinary art.

## Spices

Success or failure of many recipes often depends on the type and quality of flavor enhancers used. Spices like clove, coriander, black and white pepper, cumin, nutmeg, cardamom, allspice, and cinnamon are an absolute necessity in any kitchen. Unfortunately, spices quickly lose their flavor and aroma after they are ground. I suggest, if you must buy ground spices, buy them in the smallest amounts possible because the average life of preground spices is only about three months, even when they're stored in the refrigerator where they can easily get lost. Plus it is usually not possible

for the average home cook to use all of a package of pre-ground spices in a three-month period, even when the spice is purchased in the smallest possible package. The solution to this problem is to buy whole spices and grind them yourself. Whole spices have a nearly indefinite shelf life when stored in airtight containers in a cool, dry space.

Whole spices are also cheaper to buy than pre-ground spices, especially if you buy them from one of the many spice shops that advertise on the Internet. Buying pre-ground spices in the supermarket is just like going to the sleaziest used car dealer you can find to buy an automobile; you pay too much and get second-rate quality. To buy them on the Internet, just fire up your search engine and type in the word “spice” and you’ll find vendors for almost any spice you can think of. If you live in or near a neighborhood with an ethnic grocer, try there.

Grinding whole spices has never been easier than it is today. Several kitchen equipment manufacturers make combination coffee grinder/spice mills that retail for about 10 dollars. These little mills have a high-speed electric motor that drives a small propeller-like stainless steel blade at a speed that will reduce even tough spices like whole clove to a fine powder in a matter of seconds. You can also buy a specially designed mortar and pestle, made of marble, that will perform the same grinding duties for under 15 dollars.

## Food and gas

At the risk of sounding inappropriate, I would like to say a few words about an often embarrassing consequence of consuming a wide variety of foods—intestinal gas. Flatulence is not life threatening, unless you live with some-

## My own chili seasoning

Here’s a simple recipe that demonstrates the advantage of using whole spices. I dislike commercial chili powders. In my opinion they all add “off-flavors” to chili or any other dish. But when chili powder is made from scratch you will produce a seasoning with which you can make great chili and it can also be used to enhance the flavor of many other dishes including salad dressings, table sauces, and casseroles. If you grind up a batch of this seasoning it will keep for months when stored in an airtight container and kept in your freezer.

My formula is designed to add a warm, nutty chili flavor to dishes, not spicy heat. You can add as much hot flavor as you can handle by simply adding measured amounts of powdered cayenne pepper or other pure, hot chili powder. Don’t try to prepare this chili seasoning with pre-ground spices. Use whole spices you grind yourself; otherwise, the result is a dull, stale-tasting seasoning.

### Ingredients:

2 oz. dried ancho chilies, stems, seeds, and veins removed  
2 dried pasilla chilies, stems, seeds, and veins removed  
2 Tbsp. whole cumin seed, toasted  
1 Tbsp. whole coriander seed, toasted  
4 whole cloves, toasted  
½ tsp. allspice berries, toasted  
1 Tbsp. dried marjoram  
1 tsp. dried oregano  
1½ tsp. dried, granulated garlic  
2 Tbsp. hot Hungarian paprika

### Method:

1. After removing the stems, seeds, and veins from the ancho and pasilla chilies, break or cut them up into pieces. Toast them over low heat in a heavy-bottomed skillet until they are fragrant, slightly darkened, and somewhat crisp. Do not walk away from this procedure because they’ll scorch. You want to stir the peppers constantly while they are in the pan. When they’re ready, set the toasted peppers aside to cool.
2. Using the same procedure described above, lightly toast the cumin seed, coriander seed, whole cloves, and allspice berries.
3. In a spice mill (or a coffee grinder that is reserved only for grinding spices) process the toasted peppers into a fine powder. Repeat the process with cumin seed, coriander seed, whole cloves, and allspice berries. It is important to grind each spice separately, because each has a different density and will not grind to the same consistency if ground together.
4. Combine the powdered chilies and spices with the marjoram, oregano, granulated garlic, and Hungarian paprika.

one who's got a real bad disposition. Otherwise, it just makes for an embarrassing and uncomfortable end to a wonderful meal.

The list of gas producing foods is long. It includes many of our favorites: milk, wheat, oats, potatoes, and many vegetables. Many of these foods contain what scientists call raffinose sugars, which are a prolific source of intestinal gas. The offending gas is produced when these sugars, along with starches and food fiber, reach the large intestine without being digested. Once there harmless bacteria residing in the bowel start to feed on them and give off the bothersome gas as a by-product. Raffinose sugars require a specialized enzyme (alpha-galactosidase) to break them down. However, our bodies don't produce this enzyme, so our intestinal bacteria are left to the task.

There are a number of products on the market that may help if you are troubled by flatulence. I am one who has been troubled with it all of my life, so about eight years ago I decided to try a new gas preventer manufactured by the same company that developed Lact-Aid. Beano, as it's called, contains alpha-galactosidase and is designed to be popped into your mouth along with the first bite of any potentially offending food. Much to my surprise Beano worked. It cut down on the volume of gas and eliminated that uncomfortable bloated feeling, but odor was still a problem. Over the last few years, however, I have learned a few tips that also help to reduce gas generated by bean consumption.

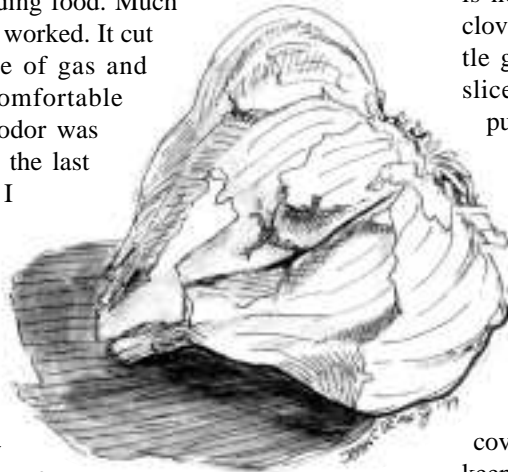
1. Cook your vegetables and beans completely. By completely I mean soft without being mushy.

2. Discard the water you soak the beans in. This water is loaded with raffinose sugars. Also, precook your beans separately and discard the cooking water, before combining them with other ingredients in a recipe. This process does not hurt the integrity of the beans and will reduce the cooking time in long cooking recipes like baked beans.

3. Many bean recipes call for the addition of other vegetables, such as onions and cabbage. Try reducing some of these ingredients before giving up the beans.

4. Always carry a book of matches (no joke). A lit match produces ozone which oxidizes those mortifying odor-causing gases.

Here are a few tips on working with two of the world's favorite flavor enhancers, fresh garlic and fresh ginger.



## Garlic

Not all fresh garlic is created equal. American garlic, which has a white skin, has a very strong flavor. Mexican and Italian garlic have mauve skins and a smoother milder flavor.

If fresh garlic is stored in an open container in a cool dark place, and the outer skin is not broken, it will stay fresh for more than two months. Once a clove is broken from the bulb, it will remain fresh for about five days.

The most efficient way to peel a garlic clove is what I call the Julia Child method. Place the unpeeled clove on the cutting board, clear the kitchen of all friends and family, then take careful aim and whack the clove with the flat side of the blade of a cleaver or a french knife. It works every time, but I suggest you practice a little.

Once in a while we forget a bulb of garlic and the cloves start to sprout. This is not always evidenced by a little green shoot poking out through the clove. More often you will notice that the garlic has developed a very strong and harsh flavor and aroma. When I discover this, I usually toss the garlic in the trash and buy a fresh bulb. However, when this is not possible, you can tame the flavor by cutting each clove in half with a sharp paring knife and removing the little green shoot hiding inside. After removing the shoot, slice the garlic cloves instead of crushing, chopping, or pureeing them. This reduces the amount of essential oils that will be released into the recipe.

I feel that garlic is an essential ingredient in many foods and I use a lot in a short time. When I am assembling a recipe, especially a new one, I find that peeling garlic cloves can be a hassle. I solve the problem by first separating the cloves from a whole bulb of garlic then dropping them into boiling water for about 15 seconds. This makes them easy to peel. I then put the peeled cloves into a half pint jelly jar, cover them with peanut oil, seal the jar with a new lid, and keep the jar in the refrigerator. The garlic will stay fresh for two weeks. When the garlic is gone I use the wonderfully scented oil to add subtle flavor to a variety of hot and cold foods.

Once fresh garlic is placed in oil, that oil must be kept in the refrigerator, if you intend to use it in recipes after the garlic is gone. If I don't use this garlic scented oil within three days after the garlic is gone, I discard the oil.

## The garlic press

If you don't own a garlic press I suggest you get one as soon as possible. Buy a good one, preferably one made of stainless steel. A garlic press makes quick work of preparing garlic for most recipes. It isn't even necessary to peel a garlic clove before passing it through the press. Just pop the clove, skin and all, into the press and squeeze.



## Vermont baked beans

Several years ago my daughter announced to me that she did not like baked beans. This was a real let down because, like many New Englanders, baked bean casserole is a regular item on our weekly menu. "I don't like the taste of molasses, and the beans make me feel fat and uncomfortable," were her reasons. I knew how to get around the molasses, but the intestinal gas was going to take some work. After two years of research and 12 failed recipe attempts I came up with three recipes that relieved both problems, plus satisfied the taste of her two brothers Jason and Michael. This recipe also puts to the test all of the kitchen tips that we have been talking about in this column. However, the roasted spices are not ground; they are cooked whole. When spices are cooked whole instead of ground, they impart a more subtle flavor. Give the recipe a try and let me know what you think.

**Note:** slab bacon is processed two ways. One type is cured in brine and the other is dry smoke cured. If at all possible use the dry cure variety in this recipe. You can tell if bacon is cured in brine by reading the label on the package. Don't let anyone tell you that there is no taste difference between the two. The taste of the dry cured is far superior.

### Ingredients:

1 cup dried white beans	1 Tbsp. olive oil
1 cup dried kidney beans	1 medium onion, diced
water to soak beans	1 carrot, peeled and diced
water to simmer beans	3 fresh garlic cloves, chopped fine
1 tsp. whole cumin seed	1 Tbsp. marinated fresh ginger, chopped fine
½ tsp. whole coriander seed	½ cup beer or ale
1 stick cinnamon	1 cup chicken stock
6 whole black peppercorns	1 10 oz. can diced tomatoes with chili peppers
4 whole cloves	½ cup pure maple syrup
2 dried bay leaves	zest from one orange
½ lb. smoke cured slab bacon, diced (If you don't eat pork, omit the bacon. It will change the flavor of the dish somewhat but the casserole will still be delicious.)	¼ cup fresh cilantro, chopped

### Method:

1. Soak the beans overnight in cold water. Use enough water to cover by at least two inches. Change the water and add fresh water at least once during the soaking process.
2. Discard the soaking water, rinse the beans in cold water, and set them in a suitable size pot over medium heat. When the water starts to boil, reduce the heat to a point where the beans are just simmering. Simmer them for 45 minutes, or until they begin to soften. Test them for tenderness by biting into one or two beans from the pot. Drain the beans, discard the cooking water and set the beans in an 8 or 10 cup casserole or bean pot.
3. In a heavy bottom skillet, roast each of the spices over low heat until they begin to brown and add them to the beans. Add the bay leaves without roasting them.
4. Add the diced bacon to the same skillet and saute over low heat until it begins to brown and about half of the fat has been rendered out. Remove the rendered bacon from the fat and add it to the casserole.
5. Add the olive oil to the same pan, increase the heat to medium, and add the onion and carrot. Saute this mixture until the onion becomes opaque, add the garlic and ginger. Continue to saute the mixture for about 30 seconds then add the mixture to the casserole.
6. Preheat the oven to 250 degrees. Combine the beer or ale with the chicken stock, diced tomatoes and maple syrup. Add this mixture to the casserole.
7. Put the lid on the casserole and place it in the oven. Slow cook the beans for five or six hours or until the beans are very tender without being mushy. If the beans become dry during this time, rehydrate them by adding a little chicken stock.
9. During the last hour of cooking remove the cover from the casserole or bean pot.
10. While the beans are cooking, remove the zest (the colored part of the skin) from the orange with a hand grater and mix it with the chopped cilantro. **Caution:** Don't remove any of the white under flesh from the orange. This flesh is usually very bitter and will ruin the delicate flavor of the casserole. Sprinkle this mixture on top of the casserole just before serving.

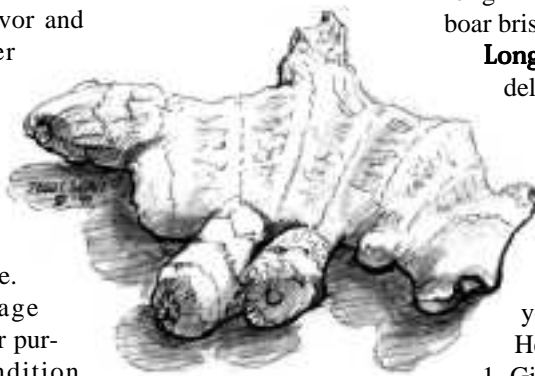
Cleaning a garlic press can be a hassle. To make cleaning less arduous, I keep a cup of warm water on the counter while I am using the press. During a cooking session, after each use, I place the press in the warm water. This prevents the garlic residue from drying onto the press. When I'm done cooking I take press from the water and place it in the dishwasher in the open position on top of the silverware. One pass through the dishwasher is usually sufficient. If you don't have a dishwasher, or you don't plan to run your dishwasher for a couple of days, add a little liquid dish soap to the warm soaking water, soak the press for about an hour, then clean it using a tooth brush you have set aside for special cleaning projects.

When working with the recipes in my columns, the only time a garlic press is called for is when the instructions call for garlic to be "minced fine."

## Ginger

In my opinion fresh ginger is one of the most versatile flavor enhancers available. It can be used to add spark to soups, salads, casseroles, vegetables, and baked goods. Fresh ginger can be purchased in two forms, young ginger and mature ginger. Young ginger, which is sold under the name of Jamaican ginger in many Asian grocery stores during the spring, has a tender, pale skin and a delicate mild flavor. Jamaican ginger does not require peeling before being used in a recipe. Mature ginger has a tough tan skin, which must be removed before use, and a strong spicy flavor and aroma. Mature ginger can be found in most food stores throughout the year.

Ginger, like garlic, can also be a hassle to peel when you are trying to assemble a recipe. Under the best storage conditions, fresh ginger purchased in prime condition only has a shelf life of about three weeks. After that it's smooth skin wrinkles and the flesh inside turns an ugly grey and develops an unpleasant acrid odor. Unless you use a lot of this very expensive root, half, if not more of what you buy, ends up in the trash. A great way to store freshly peeled mature ginger, is to cut it up into ½-inch pieces, place them in a half-pint jelly jar, and cover them with a light dry sherry. Seal the jar with a new cap and place it in the refrigerator where it will keep for three months. When the ginger is gone the, the ginger flavored sherry can be used to enhance the flavor of stir-fried and many other dishes. Fresh ginger can also be peeled, placed



in freezer bags, and put in a freezer where it can keep for up to a year.

## Barbecue

I feel that barbecue cooking must always be a pleasure. If it becomes a chore, stop and use your oven. Here are a few basic tips to help you make all barbecue sessions fun.

Equipment that is nice to have:

**Meat thermometer:** This is a tool most professional cooks would feel naked without and usually have one hanging from their pocket when they enter the kitchen. They are easy to use and serve as a great tool for eliminating the complaint, "This meat is still raw." Here's a chart I find helpful when cooking meats, indoors or out.

**Long handled tongs:** I don't feel comfortable poking any food with a fork while it is being grilled. Tongs do a better job and don't damage food by allowing valuable juices to spill into the fire.

Meat	Rare	Medium	Well Done
Beef	140°F	160° F	175°F
Pork	-	160°F	170°F
Lamb	140°F	160°F	170°F
Poultry	-	165°F	-

**Basting brush:** The expensive long handled brushes made for grilling do not baste food any better than a standard, flat, boar bristle kitchen brush.

**Long handled offset spatula:** A nice item for turning delicate items like fish .

**Charcoal lighting chimney:** This, in my opinion, is the safest and quickest way to light charcoal briquettes. Follow the instructions that come with the unit and you can't go wrong.

**Skewers with ½-inch wide flat shanks:** Great for solving the problem of food spinning around as you try to turn it over.

Here are some tips to make your barbecuing easier.

1. Give yourself at least 30 minutes after you light your charcoal to allow it to burn to the point of forming a white ash.
2. Use only high quality brand-name charcoal. Bargain charcoal causes more problems than cost savings justify.
3. Store your charcoal in a place that is dry. If this is not possible, place your charcoal into high quality plastic bags and seal the bags tight.
4. Use only the amount of charcoal required for the item being grilled. Excessive amounts cause dangerous flare ups and charred food.
5. Charcoal briquettes and natural lump charcoal burn at different temperatures: Briquettes burn at about 350 degrees F; natural charcoal burns at 600 degrees F.

If you have a Weber-type grill with a cover and would like to add a new fragrance and flavor to your grilled foods, try this.

**Mix together:**

4 dried bay leaves, crumbled  
1 tsp. dried oregano leaves  
1 tsp. dried thyme leaves  
½ cup hardwood chips, soaked in warm water for 30 minutes  
½ cup loose tea leaves  
1/3 cup brown sugar  
zest from one orange  
1 tsp. whole anise seed

Just before placing the items to be grilled in the grate, move all of the coals to one side of the grill, place the items to be grilled on the grate, but on the opposite side of the grill, so they are not directly over the coals, then sprinkle this mixture onto the hot coals. Place the cover on the grill, making sure the upper and lower air holes are open about half way. Leave the lid in place, without peaking for about 15 minutes. Remove the lid and finish cooking as you usually do.

Later I'm going to give you more kitchen tips and I will suggest some other pieces of equipment that will help make the time that you spend in the kitchen more enjoyable. At one time some of this equipment was very much overpriced and not widely available. Technology and free market competition has changed all of that. High quality kitchen equipment, designed for the home kitchen, is now available in many retail stores and on the Internet at good prices. I'll show you how to use some of them in the next issue. Δ

**Christmas Day**

I sat at the window,  
A cap gun in my hand,  
Plastic cowboys and Indians scattered on the floor  
behind me.  
Under the tree there were boxes  
Still bearing shirts, pants, socks, and underwear  
for school.  
But I stared out the window  
At the kids down on Andrew Street  
Riding their brand-new bikes,  
With their chrome fenders flashing like knife  
blades in the sun.  
And already that morning I'd been up to Eddie's  
To see his new Lionel trains  
And BB gun,  
And I wondered why Santa brought  
Bikes, electric trains, and BB guns  
To the kids whose fathers lived at home  
And had jobs,  
Fathers who could have bought those things  
Any day of the year.  
But I sensed, even at that age,  
I shouldn't ask my mother to explain this mystery.  
I knew I wouldn't like the answer.

**John Silveira**  
Ojai, California

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# THE IRREVERENT JOKE PAGE

(Believing it is important for people to be able to laugh at themselves, this is a continuing feature in *Backwoods Home Magazine*. We invite readers to submit any jokes you'd like to share to *BHM*, P.O. Box 712, Gold Beach, OR 97444. There is no payment for jokes used.)

A husband and wife were having dinner at a very fine restaurant when this absolutely stunning young woman comes over to their table, gives the husband a big kiss, tells him she'll see him later, and walks away.

His wife glares at him and says, 'Who was that?!!'

"Oh," replies the husband, 'that was my mistress.'

The wife says, "That's it; I want a divorce."

"I understand," replies her husband, "But, remember, if you get a divorce, there will be no more shopping trips to Paris, no wintering in the Caribbean, no Lexus in the garage, and no more country club. But the decision is yours."

Just then the wife notices a mutual friend of theirs entering the restaurant with a gorgeous woman. 'Who's that woman with Jim?' she asks.

"That's his mistress," replies her husband.

"Ours is prettier," says the wife.

**Submitted by James Mayfield**

Someday, a long time from now, President Clinton finishes his time on earth and approaches the Pearly Gates of heaven.

"And who might you be?" inquires St. Peter. "It's me, Bill Clinton, formerly the President of the United States and Leader of the Free World."

"Oh, Mr. President! What may I do for you?" asked St. Peter.

"I'd like to come in," replies Clinton.

"Sure," says the Saint. "But first you have to confess your sins. What bad things have you done in your life?"

Clinton bites his lip and answers, "Well, I tried marijuana, but you can't call it dope-smoking because I didn't inhale. There were inappropriate extramarital relations but you can't call it adultery because we didn't have full 'sexual relations.' And I made some statements that were misleading but legally accurate. You can't call it bearing false witness because, as far as I know it didn't meet the legal standard of perjury."

With that St. Peter consults the "Book of Life" briefly, and declares, "OK, here's the deal. We'll send you somewhere hot, but we won't call it 'Hell.' You'll be there indefinitely, but we won't call it 'eternity.' And when you enter you don't have to 'abandon all hope,' just don't hold your breath waiting for it to freeze over."

**Submitted by Baron Scarpia**

## If men truly ran the world...

Regis and Kathy Lee would be chained to a cement mixer and pushed off the Golden Gate Bridge for the most lucrative pay-per-view event in world history.

Instead of "beer-belly", you'd get "beer-biceps".

Tanks would be far easier to rent.

Telephones would cut off after 30 seconds of conversation.

Instead of a fancy, expensive engagement ring, you could present your wife-to-be with a giant foam hand that said "You're #1!"

When your girlfriend really needed to talk to you during the game, she'd appear in a little box in the corner of the screen during a time-out.

Nodding and looking at your watch would be deemed as an acceptable response to "I love you".

The funniest guy in the office would get to be CEO.

At the end of the workday a whistle would blow and you would jump out of your window and slide down the tail of a brontosaurus and right into your car like Fred Flintstone.

## Too much salt

An Arab diplomat visiting the U.S. for the first time was being wined and dined by the State Department. The Grand Emir was unused to the salt in American foods (french fries, cheeses, salami, anchovies etc.) and was constantly sending his manservant Abdul to fetch him a glass of water.

Time and again, Abdul would scamper off and return with a glass of water, but then came the time when he returned empty-handed.

"Abdul, you son of an ugly camel, where is my water?" demanded the Grand Emir.

"A thousand pardons, O Illustrious One," stammered the wretched Abdul, "infidel sit on well."

**Submitted by Bill Duffy**



### Something to offend damn near everybody...

Where does an Irish family go on vacation?  
A different bar.

Did you hear about the Chinese couple that had a retarded baby?  
They named him Sum Ting Wong.

What would you call it when an Italian has one arm shorter than the other?  
A speech impediment.

What does it mean when the flag at the Post Office is flying at half mast?  
They're hiring.

Why aren't there any Puerto Ricans on Star Trek?  
Because they're not going to work in the future, either.

Did you hear about the dyslexic rabbi?  
He walks around saying "Yo."

What do you call an Alabama farmer with a sheep under each arm?  
A pimp.

What's the difference between a southern zoo and a northern zoo?  
A southern zoo has a description of the animal on the front of the cage, along with the recipe.

What's the Cuban national anthem?  
"Row, row, row your boat."

### Finally! A blonde GUY joke

**A**n Irishman, a Mexican and a blonde guy were doing construction work on scaffolding on the 20th floor of a building. They were eating lunch and the Irishman said, "Corned beef and cabbage! If I get corned beef and cabbage one more time for lunch I'm going to jump off this building."

The Mexican opened his lunch box and exclaimed, "Burritos again! If I get burritos one more time I'm going to jump off, too."

The blonde opened his lunch and said, "Bologna again. If I get a bologna sandwich one more time I'm jumping too."

Next day the Irishman opens his lunch box, sees corned beef and cabbage and jumps to his death. The Mexican opens his lunch, sees a burrito and jumps too. The blonde opens his lunch, sees the bologna and jumps to his death also.

At the funeral The Irishman's wife is weeping. She says, "If I'd known how really tired he was of corned beef and cabbage I never would have given it to him again! The Mexican's wife also weeps and says, "I could have given him tacos or enchiladas! I didn't realize he hated burritos so much."

Everyone turned and stared at the blonde's wife. "Hey, don't look at me" she said. "He made his own lunch."

### ANAGRAMS

An anagram, as you all know, is a word or phrase made by transposing or rearranging the letters of another word or phrase.

dormitory	dirty room
evangelist	evil's agent
desperation	a rope ends it
The Morse code	here come dots
slot machines	cash lost in 'em
animosity	is no amity
mother-in-law	woman Hitler
snooze alarms	Alas! no more z's
Alec Guinness	genuine class
semolina	is no meal
The public art galleries	large picture halls, I bet
a decimal point	I'm a dot in place
the earthquakes	that queer shake
eleven plus two	twelve plus one
contradiction	accord not in it

#### And for the grand finale:

Clinton, President of the USA	to copulate, he finds interns
-------------------------------	-------------------------------

**Submitted by Baron Scarpia**

A funeral service is being held in a church for a woman who has just passed away. At the end of the service, the pallbearers are carrying the casket out when they accidentally bump into a wall jarring the casket. They hear a faint moan. They open the casket and find that the woman is actually alive. She lives for 10 more years and then dies. A ceremony is again held at the same church and at the end of the service the pallbearers are again carrying out the casket. As they are walking, the husband cries out, "Watch out for the wall!"

**Submitted by Jeff Rutter**

# Think of it this way:

## The greatest American who was never President

"The election's next year, right?" I asked.

Dave Duffy, the publisher of *Backwoods Home Magazine*, was editing a rather lengthy article on water. I don't know if he didn't hear me or just didn't realize I was talking to him. He didn't say anything, so I repeated the question.

He turned when he realized I was talking to him. He looked up at the ceiling for just a second, then said, "Yeah, November 2000."

He started to turn back to his work.

"Who do you think will be running?" I asked.

He hesitated. "Right now it looks like Bush and Gore."

"Who do you think will win?"

He looked at me somewhat exasperated. "What are you asking for?"

"I'm trying to get some ideas for a column."

He nodded. "If it's a contest between those two, Bush is in the lead, just now, and I think he can maintain it. But who knows? In 1991, his father just came off winning Desert Storm and had one of the highest approval ratings for a President in history—92 percent or something like that—and Clinton was way back in the pack among the Democratic contenders. He didn't even look like he'd be in the election. The next year, Clinton was on the way to the White House and Bush was heading for his vacation home in Maine to retire."

I nodded and he returned to his work. But I wanted a more definitive opinion, so I looked across the room at Mac. O.E. MacDougal is our poker-playing friend from southern

California. He was up for another round of battle with the local fish.

"What do you think?" I asked him.

He looked up. "Who do I think will win the 2000 presidential election?"

"Yeah."

"It's going to be someone I'm not going to like."

"But who do you think it's most likely to be?"

"Dave's right, it's too early to tell. It's such a long way from here to election, and early front-runners have a way of fading. By November of next year I'd guess there's a 50 percent chance that the person who gets elected will be someone no one would give much of a chance to today. But the man to beat right now *is* George W. Bush."

"Who do you think is the best man for the job?"

"Ron Paul."

Dave turned around again and I gave him that "who-in-the-world-is-that" look.

"Ron Paul was the Libertarian candidate in 1992, wasn't he?" Dave asked.

"1988," Mac said. "He's a Republican congressman from Texas now."

"Why do you like him?" I asked.

"At the national level, he's closer to the Founding Fathers than anyone else I can think of—more of a constitutionalist, if you know what I mean."

"Is there a way to find out more about him?" I asked.

"He has a web site."

(I did a quick websearch as we talked and there he was at



**John Silveira**

<http://www.house.gov/paul/display.htm>

"I also like Dick Armey," Mac continued, "because he's an economist and a lot of his beliefs parallel Paul's."

"And I'd give a nod to the new Minnesota governor, Jesse Ventura. I know, when he runs for any office again, the media will focus on the clownish aspects of wrestling, but what's more important is that, though he ran on the Reform ticket, his beliefs are at odds with the Reform Party platform and are more in line with the Libertarians."

"At odds, how?" I asked.

"The Reform Party's motto is, 'less government.' But, starting even with the party's founder, Ross Perot, every solution they propose to the problems that face us in society is a government solution. Their programs are really no different from what the Republicans and Democrats offer."

"Then why did so many people vote for Perot?" I asked.

"In voting for so-called 'change,' the electorate unwittingly chose something familiar."

"How's Ventura so different?"

"Listen to what he says; at heart he's a Libertarian. He genuinely believes in getting government off our backs. With any luck he'll either move over to the Libertarian Party and give them a presence or he'll reshape the Reform

Party into something that offers the American people a real and rational choice."

"Do you think the Republicans would ever nominate Ron Paul?" I asked.

He laughed. "Not a chance."

"Hey, Mac, who do you think is the greatest American *never* to be president?" Dave asked.

Without hesitation he said, "George Mason."

Now Dave gave me the same who-in-the-world look I had given him moments before.

Dave asked, "In 30 words or less, who is he?"

Mac opened his mouth to say something, but he looked at me for a moment, then back at Dave. "He's a contemporary of Washington and Jefferson and you can thank him for the *Bill of Rights*—that's 17 words."

"I thought we had Jefferson or Madison to thank for the *Bill of Rights*," I said.

"No, Jefferson endorsed the concept, but he wasn't the originator. And Madison steered it through the Congress, but the ideas weren't his. As a matter of fact, the irony is that even though Madison honchoed the legislation through the Congress, he originally opposed including a bill of rights in the *Constitution*."

"Really?" Dave asked.

"Yeah."

Dave thought a second. "George Mason, huh? What else can you tell me about him?"

"Do you guys want to get me started?" Mac asked.

"Is there a lot to say?" Dave asked.

"It depends on how much you want to know about him."

"How important was he?"

"I could make a short list and title it 'The most important Americans you never heard of,' and Mason's name would head it."

Dave drummed his fingers on his desk. I grabbed the World Almanac from the bookshelf.

"You won't find him in there," Mac said.

I looked anyway. He was right.

"You've got me interested," Dave finally said.

Mac began: "If any other man deserves to have his name mentioned in the same sentence as Washington,



Jefferson, Madison, Benjamin Franklin, Thomas Paine, or any of the other Founding Fathers, it's Mason."

"Did Jefferson know who he was?" Dave asked.

"He knew him personally. So did Washington, Madison, Paine, Henry, the Adamses, and the others. Mason was a Virginian. He was about 18 years older than Jefferson and had a profound influence on him. Jefferson never made a secret of the fact that he revered him. He called him the wisest man of his generation. Even Madison, who is generally credited with framing the *Bill of Rights*, and who became the fourth President, considered Mason one of the most profound and penetrating thinkers of his time. And he was right. Washington himself called

upon him many times. In fact, many of the Founding Fathers, whose names nowadays roll off the tongues of school children, knew who he was, were influenced by him, and sought his advice."

"I can't believe this guy could be so important but I've never heard of him," Dave said. "Is this some kind of a joke?" he asked suspiciously.

Mac laughed and shook his head.

"Okay," Dave said, threw his feet up on his desk and leaned way back in his chair. "Tell me all about this guy."

"You've got an issue to turn out," Mac said knowing we were in deadline.

"We're taking a break."

## The Declaration of Rights

"Mason's fellow Virginians, and this included the lawyers, deferred to him with the acknowledgement that no one else in the colony knew the colonial laws as well as he. It was also a tacit acknowledgement of his capabilities and honesty. In a six week period, during May and June of 1776, he wrote the state's constitution and its bill of rights, called the *Virginia Declaration of Rights*."

"The *Declaration of Rights* was adopted in June, three weeks before the *Declaration of Independence* was signed at the Continental Congress. In it he held that 'All men are by nature born equally free and independent' and 'that all power was originally lodged in, and consequently derived from, the people.'"

"Those words sound familiar," I said.

"Of course they do. Jefferson paraphrased them in the preamble to the *Declaration of Independence*."

"Did Jefferson give Mason credit?"

"The others at the Continental Congress knew where the words came from. Mason's *Declaration* had been

## The Virginia Declaration of Rights

Adopted unanimously June 12, 1776

*A Declaration of Rights made by the representatives of the good people of Virginia, assembled in full and free Convention; which rights do pertain to them, and their posterity, as the basis and foundation for government.*

1. That all men are by nature equally free and independent, and have certain inherent rights, of which, when they enter into a state of society, they cannot, by any compact, deprive or divest their posterity; namely, the enjoyment of life and liberty, with the means of acquiring and possessing property, and pursuing and obtaining happiness and safety.

2. That all power is vested in, and consequently derived from, the people; that magistrates are their trustees and servants, and at all times amenable to them.

3. That government is, or ought to be, instituted for the common benefit, protection, and security, of the people, nation, or community, of all the various modes and forms of government that is best, which is capable of producing the greatest degree of happiness and safety, and is most effectually secured against the danger of mal-administration; and that, whenever any government shall be found inadequate or contrary to these purposes, a majority of the community hath an indubitable, unalienable, and indefeasible right, to reform, alter, or abolish it, in such manner as shall be judged most conducive to the publick weal.

4. That no man, or set of men, are entitled to exclusive or separate emoluments or privileges from the community, but in consideration of publick services; which, not being descendible, neither ought the offices of magistrate, legislator, or judge, be hereditary.

5. That the legislative and executive powers of the state should be separate and distinct from the judicative; and,

that the members of the two first may be restrained from oppression, by feeling and participating the burdens of the people, they should, at fixed periods, be reduced to a private station, return into that body from which they were originally taken, and the vacancies be supplied by frequent, certain, and regular elections, in which all, or any part of the former members, to be again eligible, or ineligible, as the laws shall direct.

6. That elections of members to serve as representatives of the people, in assembly, ought to be free; and that all men, having sufficient evidence of permanent common interest with, and attachment to, the community have the right of suffrage, and cannot be taxed or deprived of their property for publick uses without their own consent, or that of their representatives so elected, nor bound by any law to which they have not, in like manner, assented, for the publick good.

7. That all power of suspending laws, or the execution of laws, by any authority without consent of the representatives of the people is injurious to their rights, and ought not to be exercised.

8. That in all capital or criminal prosecutions a man hath a right to demand the cause and nature of his accusation, to be confronted with the accusers and witnesses, to call for evidence in his favour, and to a speedy trial by an impartial jury of his vicinage, without whose unanimous consent he cannot be found guilty, nor can he be compelled to give evidence against himself; that no man be deprived of his liberty except by the law of the land, or the judgement of his peers.

9. That excessive bail ought not to be required, nor excessive fines imposed, nor cruel and unusual punishments inflicted.

10. That general warrants, whereby any officer or messenger may be com-

manded to search suspected places without evidence of a fact committed, or to seize any person or persons not named, or whose offense is not particularly described and supported by evidence, are grievous and oppressive and ought not to be granted.

11. That in controversies respecting property, and in suits between man and man, the ancient trial by jury is preferable to any other, and ought to be held sacred.

12. That the freedom of the press is one of the greatest bulwarks of liberty, and can never be restrained but by despotick governments.

13. That a well regulated militia, composed of the body of the people, trained to arms, is the proper, natural, and safe defense of a free state; that standing armies, in time of peace, should be avoided as dangerous to liberty; and that, in all cases, the military should be under strict subordination to, and be governed by, the civil power.

14. That the people have a right to uniform government; and therefore, that no government separate from, or independent of, the government of Virginia, ought to be erected or established within the limits thereof.

15. That no free government, or the blessings of liberty, can be preserved to any people but by a firm adherence to justice, moderation, temperance, frugality, and virtue, and by frequent recurrence to fundamental principles.

16. That religion, or the duty which we owe to our Creator, and the manner of discharging it, can be directed by reason and conviction, not by force or violence; and therefore all men are equally entitled to the free exercise of religion, according to the dictates of conscience; and that it is the mutual duty of all to practice Christian forbearance, love, and charity, towards each other.



copied and sent to the other colonies. Up and down the Atlantic seaboard it was read aloud in public places, printed in newspapers, considered, debated, and admired. There wasn't a man at the Congress who hadn't seen the *Declaration* or knew who its author was. And one after another, first Pennsylvania, then Maryland, then Delaware, then North Carolina and others took most or all of the *Declaration of Rights* and either made them amendments to their own constitutions or incorporated them directly into their constitutions."

"Did Mason realize this?" Dave asked.

"Of course he did, as did others like Washington, Jefferson, and Madison.

"Even the French used it as a model when they wrote their *Declaration of the Rights of Man and the Citizen* in 1789."

"Then he made a big impression in his day," I said.

"He did, but not all of it was favorable. Quite a few of his contemporaries took exception to his words that 'all men are created equally free and independent.' At issue was slavery and quite a few people felt those words written by Mason could inspire slaves to revolt.

"But Mason, though a slave owner, had come to find slavery reprehensible and morally indefensible. Furthermore, he questioned its economic principles and said it actually hurt the economy of the southern states. Economists have since pointed out that he was right.

"But the death knell for slavery came only with the concept that *all* men possess natural rights. It started with English philosophers, particularly John Locke. But it saw its very first application, its first appearance in a government document, in Mason's *Virginia Declaration of Rights* and it spread like wildfire through the colonies, to the chagrin of many slave owners. After the other states incorporated his *Declaration* into their own

constitutions many of them then abolished slavery as unconstitutional.

"But slavery wasn't the only issue that made him unpopular. Though a member of the Anglican Church, he found continuing to maintain the Anglican Church as the official church of Virginia, supported by taxes so that its clergymen were paid by the state, objectionable. Sentiments like these did not make many of his fellow Virginians very happy.

"In the meantime, he was also busy with other things. He assisted in the formation and maintenance of Virginia's militia, he was called upon by lawyers when they began to revise the old laws and create new ones for the commonwealth, and, after the war began, Washington asked him to take the lead in helping control the inflation which threatened to wreck the economy of all of the new states.

## *The Constitution*

"Between the end of the Revolutionary War, in 1783, and the Constitutional Convention, in 1787, Mason took some stances that didn't make him popular with his fellow Americans. For instance, he didn't believe, despite the war with Britain, that Americans should use the war as an excuse to renege on their debts to British merchants. Many of his countrymen would love to have done this, but, as he pointed out, it wasn't with the merchants they'd been fighting.

"But even more pressing problems faced the new nation. The united front displayed by the separate states, that had existed in the face of war, dissolved when independence was won and the fledgling country needed men like Mason to guide them through the tough times ahead. But after the War for Independence he found his council was less sought. Those in politics did not put much faith in the words of someone who chose not to get involved. Yet, the new nation, established with the Articles of Confederation in 1777, was founder-

ing. After 10 years representatives from each state agreed to meet to try to fix the problems by amending the Articles of Confederation at a Congress in Philadelphia.

Mason was among those called upon. He grudgingly said he would reenter public life and, for the first time, he would even serve outside Virginia. The trip to Philadelphia would be the longest trip of his life. But we're lucky he made it. Over the next three and a half months his inputs profoundly determined the future course the United States was to take.

"As I said, what these guys were supposed to be doing was amending the Articles of Confederation, which were the framework for the new United States, but once they got to Philadelphia what they did was to propose a whole new government. They wrangled for most of the summer creating a new government that would have more power and run more efficiently than it did under the *Articles of Confederation*, and finally, in September of 1787, most of the delegates to the convention were ready to wrap up business.

"Only Madison had had a greater input into the new *Constitution* than Mason, and during the Convention Mason, though older than most of the delegates, proved himself to still be a master debater and able politician.

"But with the Convention drawing to a close and the other delegates wanting to go home, it's ironic that the man who hated public service, who was always late and often absent from meetings of government, wanted the Convention to go on. And if not continue, he wanted another Convention scheduled for later. He felt there were matters that still had to be addressed. He still felt the federal government, including the Presidency, was too strong and would be a sleeping monster that would eventually crush the people. But foremost was his concern that the delegates had neglected to include a declaration of rights. He offered to the Convention a list of

## Objections to this Constitution of Government

*by George Mason*

**T**here is no Declaration of Rights, and the laws of the general government being paramount to the laws and constitution of the several States, the Declarations of Rights in the separate States are no security. Nor are the people secured even in the enjoyment of the benefit of the common law.

In the House of Representatives there is not the substance but the shadow only of representation; which can never produce proper information in the legislature, or inspire confidence in the people; the laws will therefore be generally made of men little concerned in, and unacquainted with their effects and consequences.

The Senate have the power of altering all money bills, and of originating appropriations of money, and the salaries of the officers of their own appointment, in conjunction with the president of the United States, although they are not the representatives of the people or amenable to them.

These with their other great powers, viz.: their power in the appointment of ambassadors and all public officers, in making treaties, and in trying all impeachments, their influence upon and connection with the supreme Executive from these causes, their duration of office and their being a constantly existing body, almost continually sitting, joined with their being one complete branch of the legislature, will destroy any balance in the government, and enable them to accomplish what usurpations they please upon the rights and liberties of the people.

The Judiciary of the United States is so constructed and extended, as to absorb and destroy the judiciaries of the several States; thereby rendering law as tedious, intricate and expensive, and justice as unattainable, by a great part of the community, as in England, and enabling the rich to oppress and ruin the poor.

The President of the United States has no Constitutional Council, a thing unknown in any safe and regular govern-

ment. He will therefore be unsupported by proper information and advice, and will generally be directed by minions and favorites; or he will become a tool to the Senate—or a Council of State will grow out of the principal officers of the great departments; the worst and most dangerous of all ingredients for such a council in a free country; From this fatal defect has arisen the improper power of the Senate in the appointment of public officers, and the alarming dependence and connection between that branch of the legislature and the supreme Executive.

Hence also sprung that unnecessary officer the Vice-President, who for want of other employment is made president of the Senate, thereby dangerously blending the executive and legislative powers, besides always giving to some one of the States an unnecessary and unjust preeminence over the others.

The President of the United States has the unrestrained power of granting pardons for treason, which may be sometimes exercised to screen from punishment those whom he had secretly instigated to commit the crime, and thereby prevent a discovery of his own guilt.

By declaring all treaties supreme laws of the land, the Executive and the Senate have, in many cases, an exclusive power of legislation; which might have been avoided by proper distinctions with respect to treaties, and requiring the assent of the House of Representatives, where it could be done with safety.

By requiring only a majority to make all commercial and navigation laws, the five Southern States, whose produce and circumstances are totally different from that of the eight Northern and Eastern States, may be ruined, for such rigid and premature regulations may be made as will enable the merchants of the Northern and Eastern States not only to demand an exorbitant freight, but to monopolize the purchase of the commodities at their own price, for many years, to the great injury of the landed interest, and impoverishment of the peo-

ple; and the danger is the greater as the gain on one side will be in proportion to the loss on the other. Whereas requiring two-thirds of the members present in both Houses would have produced mutual moderation, promoted the general interest, and removed an insuperable objection to the adoption of this government.

Under their own construction of the general clause, at the end of the enumerated powers, the Congress may grant monopolies in trade and commerce, constitute new crimes, inflict unusual and severe punishments, and extend their powers as far as they shall think proper; so that the State legislatures have no security for the powers now presumed to remain to them, or the people for their rights.

There is no declaration of any kind, for preserving the liberty of the press, or the trial by jury in civil causes; nor against the danger of standing armies in time of peace.

The State legislatures are restrained from laying export duties on their own produce.

Both the general legislature and the State legislature are expressly prohibited making *ex post facto* laws; though there never was nor can be a legislature but must and will make such laws, when necessity and the public safety require them; which will hereafter be a breach of all the constitutions in the Union, and afford precedents for other innovations.

This government will set out a moderate aristocracy: it is at present impossible to foresee whether it will, in its operation, produce a monarchy, or a corrupt, tyrannical aristocracy; it will most probably vibrate some years between the two, and then terminate in the one or the other.

The general legislature is restrained from prohibiting the further importation of slaves for twenty odd years; though such importations render the United States weaker, more vulnerable, and less capable of defence.

his objections beginning with the words, 'There is no Declaration of Rights...' But in the end, the other delegates spurned his suggestions.

"They just wanted to get out of Philadelphia," Dave said.

"That's right. But you've got to understand, Mason, like the others wanted an effective national government. But he wanted more safeguards built in. For instance, he didn't want a standing army. He wanted a militia that would be called up in time of war. But he did not want Congress to control the militia; he wanted that to remain in the hands of the people and the states. This was just one of the problems he felt was unresolved by the delegates.

"Why was he opposed to the existence of a standing army?" Dave asked.

"It entices foreign adventures—the European armies were constantly busy—and eventually it would be used as a police force.

"He also felt the *Constitution* was unnecessarily vague in its wording. Among other things, he objected to inclusion of the words to 'promote the general welfare' as part of the preamble, seeing it as a catchall clause that provides an opportunity for abuse by the government, particularly in the absence of a Bill of Rights.

"He also regretted the compromise position the Congress took on slavery. Even as a slave owner, he wanted a way to rid the country of the institution.

"He didn't like the provision that allows treaties, which are enacted by the President and two thirds of the Senate, to become the law of the land without first being reviewed by people's representatives in the House.

"He would have been a believer in term limits. He believed those who served in government should serve, then return to the position of private citizens to live under the laws and policies they had created.

"Although nowhere in the *Constitution* are there provisions for the courts to rule unconstitutional laws passed by Congress to be void, Mason believed such powers should exist and that came about during the tenure of John Marshall as Chief Justice of the United States Supreme Court, in 1803 (*Marbury vs. Madison*). Still, nowhere in the *Constitution* is this a power specifically granted to the Supreme Court. But what Mason did fear about a federal judiciary was that it would render the state courts powerless. He wanted safeguards against that.

The guarantee of rights was what the people wanted, and Mason forecast a civil war if they didn't get what they wanted.

"Though many of the provisions he wanted included in the *Constitution* were not adopted, many others were. There were proposals to make each state's representation in the House to be based on wealth. This would have given Mason's state, Virginia, the most representation, but he opposed it. He wanted representative democracy and that's what we got.

"He believed the Senate should not be popularly elected. If the House was to represent the people, the Senate was to represent the states and, until 1913, senators were appointed by the state legislatures.

"Mason had been the chief proponent of the idea that appropriations bills should originate in the House and never the Senate. He was hoping that the way the federal government spends its money would more accurately reflect the will of the people.

"He also believed the House should be constantly subject to reapportionment as the country expanded. He realized that this would eventually erode Virginia's power in the federal government as new states were added

and the population spread westward. He also wanted to ensure that as new states were admitted, they would come into the Union as equals with the existing states. This meant that neither the old states nor their citizens would have any advantage. He wanted the nation's capital separate from any of the state capitals, thus ensuring the formation of an independent district, Washington, DC.

"He wanted to ensure that representatives had to live in the district they represented, that money bills originate in the House where he felt the will of the people—and the source of the money—lay, and he wanted a certain minimum time of citizenship to be able to serve in either the House or the Senate. These were all provisions that were included.

"He wanted and got provisions to allow the impeachment of a corrupt President. He also wanted the power to declare war to rest with the Congress, not the President. Military adventures should be the will of the people, not the government."

"But today Presidents can get us involved in conflicts without declaring war," I said.

"Mason's probably whirling in his grave like a dervish," Mac said.

"How did the other delegates feel about these things?" I asked.

"More often than not, he wasn't the only delegate who called for all of these measures, but he was often the most vocal and persuasive and he had a single motive: More than anything he wanted a strong government that expressed the will of the people, *and* allowed the individual maximum freedom.

"But he also didn't want a government that allowed the tyranny of the majority, either. Among other things he wanted a provision that commercial laws could not be passed without two thirds majority in both the House and Senate to pass them. What he feared was that the populous northern states would engage in economic tyranny of

the majority over the less populous southern states.

## The Convention adjourns

“But almost all the other delegates present felt it was time to sign the document and submit it to the states. Some of the delegates had already left weeks earlier so they couldn’t sign it, but Randolph and Mason of Virginia and Gerry of Massachusetts were there and they *refused* to sign it.

“This left the other delegates in a quandary because they wanted a show of unanimity before the new *Constitution* was presented to the states, and all those still in attendance were expected to sign it. When it became apparent that persuasion wasn’t going to work, Gouverneur Morris of Pennsylvania—Gouverneur was his first name, not a title—offered a solution that appeased most of the delegates: since a majority of the Virginia and Massachusetts delegate did sign it, the document should include the phrase ‘unanimous consent of the states present’ and not ‘unanimous consent of all the delegates.’ It was a trick of wording, but Morris’s proposal was accepted.

“It was on this note the Constitutional Convention ended with the delegates returning to their homes. But Mason wasn’t happy. He still had his list of objections that he displayed to anyone who wanted to see them.

“Eventually, they appeared in a pamphlet titled *Objections to this Constitution of Government* which was circulated throughout the states. He personally sent copies to Washington, Jefferson, and other influential men. His list was longer now. He had added to them, protesting the regulation of the militia by the government, the power of Congress to vote itself pay raises, and other matters.

“The Federalists, as those who supported the ratification of the *Constitution* had come to be known, united to support the *Constitution* as it

stood, and to oppose Mason. Several of the essays in the *Federalist Papers* addressed Mason’s objections point by point.

“Jefferson, from his post in France, where he was ambassador, took Mason’s side, writing to Madison and others, threatening to call another Constitutional Convention and even work toward breaking up the Union unless a declaration of rights was included. The *Constitution* hung in the balance.

“Ultimately, it was by promising a declaration of rights that the Federalists started winning the opposition—now called the Anti-Federalists—over to their side.”

“You mean, to get the *Constitution* approved, they now had to promise the very thing they had rejected in the Convention?” Dave asked.

“Yes.”

“What made anyone think they were going to keep their promise once it was ratified? Politicians are famous for renegeing on campaign promises.”

“The Federalists, Madison among them, were winning the debates against the Anti-federalists in the state legislatures, but they saw the writing on the wall. Even as the state legislatures ratified it, the one and only state that allowed ratification by popular vote—Rhode Island—rejected it. And in the other states there was a popular cry for a declaration of rights—a *Bill of Rights*. The guarantee of rights was what the people wanted, and Mason forecast a civil war if they didn’t get what they wanted. So, to ensure winning a seat in the first Congress, Madison discovered that one of his campaign promises had to be that he would introduce a bill of rights, and everyone knew what that meant—he was going to push Mason’s *Declaration of Rights*.

“But Madison personally still didn’t like the idea. He was sure, and history has borne out his prediction, that any rights not specifically mentioned in the *Constitution* would be denied. It is on this basis the FDA, motor vehicle

departments, and the IRS, among others, have denied us any rights not specifically mentioned in the *Constitution*. And though the 9th and 10th Amendments were included in the *Constitution* to prevent this very thing from happening, they may as well not exist. The government has argued from day one that anything not specifically mentioned in the *Bill of Rights* isn’t a right, and it has invariably won.”

“What did Mason say to this Federalist argument?” Dave asked.

“He pointed out that it was a lack of written rights that had precipitated the recent revolution because the King and the Parliament felt they could safely ignore anything not written.

“But because of his opposition to ratification, Mason became the subject of various smear campaigns. He was ridiculed as doddering and foolish.”

“How did he take that?” I asked.

“One man said it was widely known to the public that Mason’s mind was failing. Mason replied, ‘Sir, when yours fails, nobody will ever discover it.’

“Few stood by him or still regarded him as a friend, though there was still a small circle of devoted followers, among whom was the great orator, Patrick Henry, who was his ally in opposing ratification. And though the man who quoted him in the Declaration of Independence, Thomas Jefferson, had changed his position and he now concurred with the position Massachusetts took, ratify the *Constitution* now with the recommendation that a bill of rights be added later, arguing that otherwise the entire United States might fall apart, he remained an admirer of Mason.

“But one by one the states ratified the *Constitution*. Only 9 of the 13 states were needed for ratification to make the document official and, with ratification by New Hampshire, on June 21, 1788, the *Constitution* was the law of the land. Though word from New Hampshire wouldn’t reach Virginia for several more days, no one



kidded themselves; if New York and Virginia, the two most populous and important states, failed to ratify the *Constitution*, the Union could not stay together. So the struggle in Virginia continued. But even with Mason and Patrick Henry opposing it, opposition to ratification was caving in, particularly with the Federalists now promising a declaration of rights, and on June 25, 1788 Virginia ratified it. Just over a month later, New York followed suit and the viability of the United States was assured.

"But ratification now presented a dilemma to the Anti-federalists. Many of them still opposed the *Constitution* but Article VI states that to serve, all executive and judicial office holders, at both the national and state level, were bound by oath to support the *Constitution*. To continue in his posts, Mason had to swear an oath to the very document he was protesting.

"In the end he resigned from the Fairfax County Court and left public service. In 1790, he was appointed by the Virginia legislature to the United States Senate, but he refused to serve, thus avoiding the necessity of swearing an oath.

"A beaten man, he felt he had lost the most important battle of his life, along with almost all his friends.

## The Bill of Rights

"Madison, running for Congress against another future President, James Monroe, was now forced to take up the baton and campaign on the promise that Congress should enact a bill of rights. He told his fellow congressmen they should act on this while the glow of the Revolution was still upon them, that if it wasn't done soon the urgency would eventually become cold and a bill of rights would never pass."

"So now he was one of the most ardent advocates for a bill of rights," Dave said.

"Yes, and the amendments to the new *Constitution* that he presented to the Congress were culled from Mason's *Declaration*.

"It's ironic that Madison is now remembered as the prime creator of the Bill of Rights when he in fact initially opposed it and only supported it when forced to.

"It's also ironic that Mason, if remembered at all, is remembered only as one of the three Convention delegates who refused to sign the *Constitution*, when he had, in fact, more to do with shaping the good aspects of it than anyone but Madison.

"It is because of Mason that the First Ten Amendments now exist. Without him I doubt there would have been a Bill of Rights."

"What happened to Mason?" Dave asked.

"He went back to Gunston Hall to live out his life, and shortly after his retirement he died—on October 7, 1792, but not without seeing the *Bill of Rights* adopted, on December 15, 1791. Madison, in the meantime, resumed his friendship with him, and Jefferson, as ever, remained his friend. But Washington, a friend since childhood, never forgave him for his opposition and never spoke to him again.

"Not long after he died Mason was forgotten by his countrymen and history. There was a county in Kentucky named in his honor, and George Mason University was founded in 1957 in Fairfax, Virginia, but not much else. Today, if he is remembered at all, it is usually as the cantankerous old man who opposed the ratification of the *Constitution*, but few know why. For years he lay in an unmarked grave at Gunston Hall.

"Only recently have Americans rediscovered him, though the number who have is still damned few. Here and there you can find people who know he wrote the *Virginia Declaration of Rights*. Fewer still know he was the force behind the *Bill of Rights*—the First Ten Amendments of the *United States Constitution*. And

even fewer realize that he influenced the Constitutions of most of the states, the French *Declaration of the Rights of Man and the Citizen*, and the *United Nations Universal Declaration of Human Rights*. In Jefferson's own words, Mason was 'of the first order of greatness,' and he was right.

"There haven't been many documents in history, such as the *Virginia Declaration of Rights*, that have had such a huge impact on mankind, but where the author received so little recognition. It's like Christians knowing what the Bible is and who the Apostles were, but not knowing who Christ was.

"In many ways, the *Virginia Declaration of Rights* is more powerful than the *United States Constitution* itself. If there's any shortcoming in the *Constitution*, it's that it doesn't go as far as Virginia's *Declaration of Rights*. The *Declaration of Rights* is more or less an amalgam of both the U.S. *Bill of Rights* and the opening words of the *Declaration of Independence* and it contains not only our rights, but words that say that those who serve in government are there at our pleasure and are answerable to us at all times. And at any time, the government and those who serve in the government, can be replaced at the people's pleasure. Those words should have been included in our *Constitution* to serve as a reminder not only to the those who serve, but the people themselves.

"How different would this country be had he never lived?" Dave asked.

"I will state flatly that even if there had never been a Jefferson, there would still have been a Declaration of Independence; had Washington never been born, American troops would still have won the Revolutionary War—perhaps quicker. But, though others called for a bill of rights, were it not for George Mason, there simply would not have been one.

"In my opinion, he was the greatest American never to be President."

"How do you feel about his objections to the *Constitution*?" Dave asked.

"There are certain powers he wanted retained by the states that would have made the country too fragmented, but in general his objections were on the mark."

"What kind of President would he have made?" I asked.

"There's no real way to know for certain, but here was a guy who risked his life and property to support the Revolutionary War, who denounced slavery when he knew it could hurt his livelihood, and who lost almost all of his friends in a battle to ensure individual rights for everyone. But best of all he probably wouldn't have wanted the job, so he'd probably have been one of the best."

He left it there and none of us spoke. But I don't think we were sitting there for more than a few minutes when a voice asked, "Why aren't you guys working?"

It was Ilene, Dave's wife and also the business manager of the magazine. She'd just walked into the office and there was Dave, his feet still up on his desk, me slouched back in my chair, and Mac teetering back in his own chair as he faced us.

"Mac's just telling us about George Mason," Dave said.

She swept by us on her way to her desk. She got a lost look on her face for a moment, then said, "That's the guy who was behind the Bill of Rights, wasn't he?"

Dave looked stunned and I guess I did too.

"That's right," Mac said.

"There something wrong?" she asked.

"No," Dave said.

"No, Ilene, there's nothing wrong," Mac added. Δ

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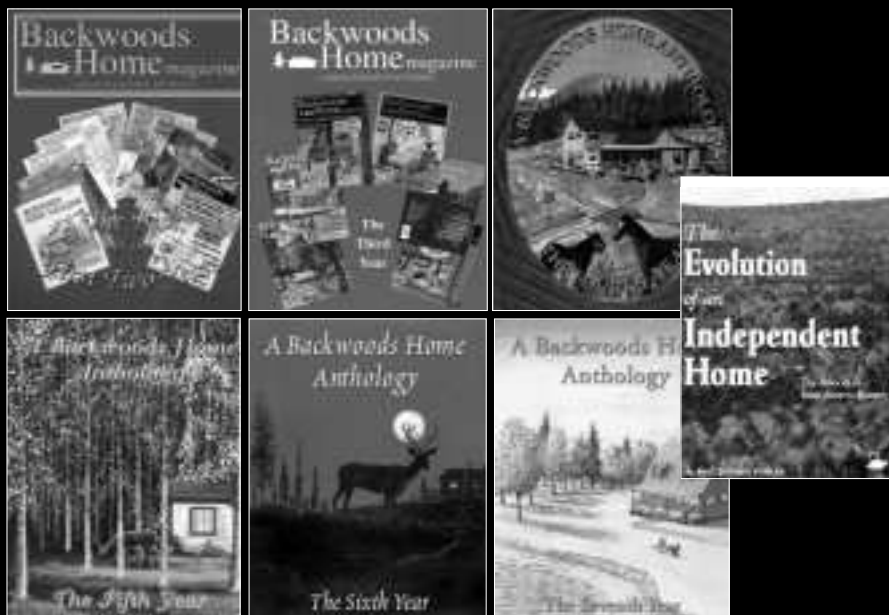
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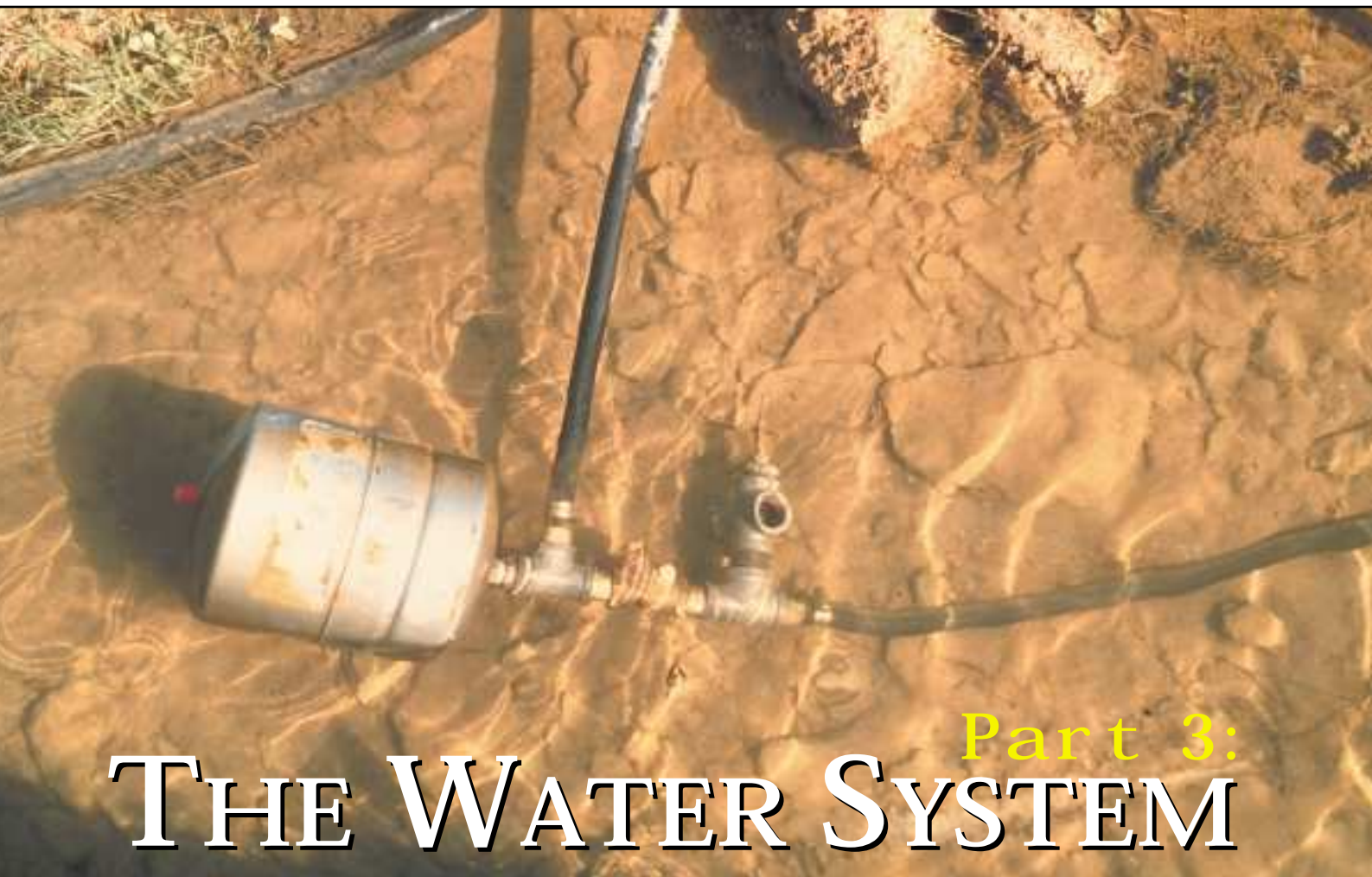
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# Part 3: THE WATER SYSTEM

## GOLD & SILVER

(This is the third and final part of our series on home water systems. Parts 1 and 2 were in Issue Nos. 58 and 59. — Editor)

By Michael Hackleman

Let's look at some examples of commonplace water systems. Three major design concepts are reflected in the Gold, Silver, and Gold-Silver systems. The Gold system is based around the "store" theme of water system design, the Silver system around the "demand" theme, and the Gold-Silver system is a hybrid of the two. [Note: Realize that these are only the

base parts of a system. Water purification and conditioning equipment, if any, are additive items, and are not treated in this article.]

### The Gold system

The Gold system (my own term) is built around the deep-well piston pump. Primary considerations in this setup are minimal use of energy, the application of low-yield energy sources, the variety of energy sources that may be applied, and accessibility to the pumping equipment for maintenance and repair. Though only one energy source may be applied initially, this system boasts the ultimate in "add-on" capability. Money permit-

ting, other energy sources may be applied as the need arises to match increasing water usage or a changing energy picture.

The Gold system is a composite of systems I've seen in manufacturer's manuals. It shows the full breadth of options available for a water system based on wind power. Even if wind energy is not accessible, the system is still sound, easily able to utilize a number of other, equally good energy sources. Systems using various arrangements of these components have withstood the test of time and tough conditions.

The Gold system is composed of a piston pump, the delivery pipe, the sucker rod, a stuffing box, pump stan-

dard or hi-pipe, a pumping jack, a motor or engine, and a wind plant in various combinations. (See figure 7 from Issue No. 59) Let's look at each part and its function in the system.

**Deep-well piston pump:** The deep-well piston pump is composed of a plunger and a stationary cylinder. (See Fig 5 from issue #59) This pump is sized to the energy source that powers it, the desired gpm (gallons per minute) rating, and the pumping head. Through careful selection, we can vary the cylinder diameter, stroke (length of pumping motion), and number of strokes per minute (usually not to exceed an upper limit of 40) to fulfill the pumping needs. (See Fig. 6 from issue #59)

Cylinders vary in size, ranging from 1¼ inch to 3½ inches inside diameter, and are made from iron, plastic, or brass. The all-brass cylinder and plunger assembly with the ball type of check valves offers the longest life, particularly in pumping highly turbid water. These cylinders come in different lengths to accommodate various sizes of wind machines or pumping jacks which can additionally offer a longer stroke.

**Delivery pipe:** A pipe is needed to position and support the piston pump in the well, house the sucker rod (which connects the drive mechanism to the piston pump itself), and transport the water to the surface. Since it must withstand water pressure, absorb the push-pull forces of the sucker rod, and guide the sucker rod with minimal resistance losses, the pipe should be rigid and strong. Two-inch (I.D.) galvanized steel pipe is the standard.

As previously mentioned, there's a unique feature in the 17/8-inch cylinder and 2-inch delivery pipe combination: the pump innards, including the two check valves, the leathers, and the plunger assembly (the only portions of the pump that are subject to wear) may be removed up through the pipe for servicing and repair as required. Remember, it's the delivery pipe that is the real weight in this system. So,

this feature makes maintenance and repair an uncomplicated affair.

When a larger size of cylinder (producing a higher pumping rate) is desired, without a corresponding increase in the size of the delivery pipe, this feature is lost. The situation is not always unavoidable. The cumulative weight of pipe becomes a problem for wells over 200 feet in depth, and a delivery pipe smaller than 2 inches may be needed for wells double this depth. Still, for wells up to 200 feet, the owner should seriously consider longer strokes and longer cylinders to increase pumping rates, rather than hasty increases in cylinder size.

**Stuffing box versus pump standard:** At the top of the well, one of two pieces of hardware will be needed: the stuffing box or the pump standard. (See Fig. 8 from issue #59) They have similar functions, but the main difference between the two is that the pump standard has a lever attached for using muscle power to pump water from the well. This assumes that you have both the muscle and the inclination. For the added fifty dollars or so in price, it's not a bad deal.

Both the stuffing box and the pump standard perform several important functions. First, they hold the in-well equipment—delivery pipe and piston pump—in position and support their combined weight. In fact, they are screwed onto the pipe end. Second, they have a watertight fitting through which the sucker rod passes and is able to move back and forth; this permits power transfer to the piston pump without spilling the pumped water. Third, the stuffing box and pump standard contain a number of fittings for attachment to the rest of the water system aboveground. And fourth, equipped with the correct type of gasket, both units provide a watertight seal over the well casing to prevent contamination of the well by dirt, insects, small animals, and surface water.

Since the primary function of either the stuffing box or pump standard is to effect a watertight seal at the point where the sucker rod emerges from the delivery pipe, an alternative to using this hardware is the hi-pipe (my term). In essence, the hi-pipe is a delivery pipe that has been extended upward to some point above the level where the water is pumped. A T-fitting anywhere between the wellhead and that point allows the water to flow out of the delivery pipe and, a few feet higher, the sucker rod emerges. Where the sucker rod is used, however, no watertight fitting is required.

The hi-pipe technique is used extensively in systems using only a water-pumping wind machine. The height of the tower might allow an easy extension of the delivery pipe to some level above that to which the water is being pumped. The tank need not be directly alongside the tower. Just as long as water storage is situated below the level of the wind machine itself, this technique can be used. However, if the delivery pipe does not extend all the way up the tower, it should be fitted with some type of cover. A watertight seal may not be required, but we'd still want to keep debris out of the well.

**Sucker rod:** The piston pump in the well is linked with the stuffing box or pump standard at the wellhead via the sucker rod, or pump rod. Moving up and down inside the delivery pipe, this transfers power from the energy source to the pump mechanism. The sucker rod is made up of sections of either wood or galvanized steel rod fitted with threaded ends. The required number of lengths, then, may be screwed together.

Wood is the preferred sucker rod material for three reasons. First, it's bulkier, and so a closer fit to the inside diameter of the delivery pipe. This helps to guide the rod and, on the downward stroke, keep the rod from bending or flexing over long lengths. Second, since the power stroke occurs on the upward swing of the rod, the



wood's buoyancy assists this motion. With a metal sucker rod, the power source must overcome the accumulated weight of the rod, too. And, third, wood rubbing against the steel delivery pipe is silent. With a metal sucker rod, there's a chance that everyone will get to hear the repeated "clang" as the rod strikes the pipe wall during pumping operations.

The sucker rod ends just below the watertight fitting in the pump standard or stuffing box. There it is secured to the smooth rod that actually moves up and down through the seal. If a water-pumping wind machine is used in the system, sucker rod is also used to transfer its power to the pump standard or stuffing box above the seal.

Pump rod and sucker rod are used interchangeably to describe the same thing. However, a rod that works between the wind machine and the pump standard will not necessarily work in the constant wet to which a rod connecting the pump standard and piston pump will be exposed. So, irrespective of the terminology, be certain that you and a supplier are talking about the same thing.

**Pumping jack:** The pumping jack is a device that converts the rotary motion of a number of energy devices such as electric motors and gasoline engines into the reciprocating (up and down) motion needed to power the piston pump. Typically, the pumping jack is bolted to the stuffing box, the pump standard (See Fig. 8 from issue #59), or the concrete pad surrounding the wellhead. With long lever arms, it's designed for quick connection to, or release from, the sucker rod protruding from the stuffing box or pump standard. In the wind energy-based system, then, the pumping jack is connected during low and no-wind conditions for water pumping as needed. If no wind system is feasible, the pumping jack may be the primary means of operating the piston pump.

The pumping jack is only a sophisticated conversion device. It is not an energy source. For this reason, a

motor or engine must be attached. This is usually no problem. A bolt plate that will accommodate either a small engine or an electric motor is part of the assembly.

The pumping jack is designed to rotate in a specific direction—clockwise or counterclockwise—and the motor or engine you select may or may not turn in the same direction. If it does, fine. If it doesn't, there's a definite problem. With an electric motor the direction of rotation may be reversible. A local motor shop can do this in a few minutes. A gas engine is not reversible. Of course, either a motor or engine could be mounted separately from the pumping jack, but it's a hassle to align the pulleys, maintain belt tension, and keep the respective assemblies from loosening up in operation. So—get a pumping jack that rotates in the same direction as your motor or engine or be prepared to buy your way into matching the pumping jack's rotation.

Quality pumping jacks have their gears running in oil. They should provide quiet and trouble-free operation for a lifetime. Check your pumping jack frequently, replacing lost oil and occasionally draining the old and filling up with new.

**Electric motor versus gas engine:** Either an electric motor or a gas engine may be bolted to the pumping jack for water-pumping operation. Gas engines are considerably noisier, and they use expensive gasoline. If there's a choice, the electric motor is the preferred power source. However, this assumes that you have electricity, either utility-supplied or generated on-site. If you don't, the gas engine is the only alternative. Don't rule out the possibility of using both. If the pumping jack is normally powered by utility-supplied electricity, it's nice to have a small gas engine as backup during a blackout or other emergency.

Manufacturers' specifications clearly designate electric-motor horsepower for given conditions—the pumping head, pumping rates, cylinder size,

etc. However, observe caution when using a gas engine with a pumping jack. Without using an intermediate jackshaft, the smallest pulley that may be attached to the engine will overspeed the pumping jack (which operates at a maximum 40 strokes per minute) at optimum engine speeds. At reduced speeds, the available engine HP is a mere fraction of the engine's rating—it can be as low as  $1/10$  the value. Hence, where a  $1/3$  HP electric motor is specified, a 3-5 HP gasoline engine will be needed to deliver the same performance.

**Water-pumping wind machine:**

The deep-well piston pump is ideally suited for use with a wind machine of the type produced by the Aeromotor, Dempster, or Baker companies. Since these aeroturbines are designed for operation at low wind speed, there are few places where they cannot be used. The least that can be said about the aeroturbines themselves is that they have evolved over a long period of time (75 to a 100 years) and that the present models are time-tested. For example, the last major design change in the Aeromotor wind machine was in 1933. Finding parts for either the new or older wind machines, however, is not a problem—a definite advantage over the change-the-model-each-year syndrome that affects other commercial equipment such as cars. This is good to know when buying a new wind machine and a lifesaver when restoring a used wind machine (if, in fact, any restoration is required).

New or used, the major expense in wind-pumped water systems is split between the wind machine itself and the tower. Which one represents the higher cost depends largely on the circumstances. Unfortunately, the best spot for digging a well is rarely the best wind site. If this is the case, the tower must extend the wind machine high enough above surrounding obstacles such as trees and houses to reach undisturbed wind. This is not only an initial problem. Since there's a tendency to site the well and wind

machine near a house and also to plant shade trees in the same location, the problem may arise in later years. Many an old farmstead may be found today with the wind machine nestled deep in the trees which have, over the years, grown above it.

If wind energy is accessible, there are a number of ways to proceed. The first is simply to buy new equipment, letting the supplier size the wind machine and tower and having him install them. This is pretty painless and, not surprisingly, expensive. An alternative is to buy the equipment and install it yourself. This is particularly applicable if you're in the boonies and there's little chance that the supplier can get his baby crane in there. Don't let the size of the job intimidate you. Learn everything you can on the subject and get the necessary help or equipment.

**Tactics:** Any situation that meets the requirements of a store type of water system will find the Gold system a cost-effective and efficient setup, particularly when used with a low-yield energy source. Again, this type of system is still a viable alternative even if alternative sources of energy are not available in sufficient amounts. An electric motor powered from utility-supplied electricity driving a deep-well piston pump through a pumping-jack pump standard boasts a higher cost-benefit ratio than a submersible pump pumping into the same storage. Furthermore, if energy use, hardware, well capacity, system versatility, and usage are evaluated honestly, the two systems are even cost competitive. In this respect, only personal preferences will sway the decision one way or the other.

If your money is limited, a tower, wind machine, and storage tank are pretty major expenses to tackle right away. A better idea is to install the pumping jack first. If electricity (utility, wind-electric, or standby generator) is available, an electric motor is used. If electricity isn't available, a gas engine may be installed. Both get

you going right now. And even if you have no storage, you get water when you want and can turn it off when you don't.

The next item to add (as money becomes available) is the storage tank. This investment will save you from having to turn on the pump every time you want water. Additionally, it will allow you to use water at higher rates than that at which water is pumped directly from the well.

Eventually, if you plan a wind-pumping setup, the tower is purchased or made, installed, and the wind machine added.

There's an alarming tendency to reverse this process. Resist it. Even if the money is available, you can't make effective use of wind-pumped water without storage. And there's no point in having storage if there's no water to put in it. It may take weeks to correctly install a tower, wind machine, and storage tank. Only a few hours are needed to complete a pumping jack installation. So get the water first, provide storage next, and then alternate means of pumping it.

**Accessories:** The Gold system has several additional components: a well seal, a screen and an in-tank level sensor.

**Well seal:** All wellheads need a sanitary seal. This seal is always watertight and sometimes airtight. In a store system, a different well seal is positioned over the wellhead casing before the pump standard or stuffing box is set atop it. It seats when either piece of hardware is bolted down to the concrete well pad.

**Screen:** The piston pump doesn't come equipped with a screen affixed solidly to the bottom of the cylinder. It's sold as an accessory. Why? With a piston pump assembly you can use a tail pipe. If you do, you'll want the screen on the bottom end of it.

While all piston pump installations should use a screen, many do not. Two reasons are given. One, at lower pumping rates like those exhibited by the piston pump assembly, there's not

as much need for the screen. And, two, in those systems where the pipe and cylinder have been sized so the pump innards may be removed up through the delivery pipe, it's ever so much easier to replace the leathers more often than it is to lift out the entire assembly to clean a screen.

**In-tank level sensor:** It's nice to know the level of water in a storage tank. This can be accomplished in at least five different ways.

1. Look inside the tank.

2. Look at a pressure gauge near the house. At .433 psi per foot, there's a 4.3 psi difference of pressure in a 10-foot high tank between empty and full.

3. Rig up a wire with a float at one end and a weight at the other. Run it out the top of the tank and down the side. Paint a scale behind the hanging weight. When it's at the bottom, the tank is full. When it's at the top, the tank is empty. Points in between will tell you how much water is present.

4. Install an electronic gizmo in the tank to give you a reading of water level. You design and install the gizmo. Hint: If it needs anything bigger than a few AA size cells to operate, you'll probably electrocute someone at some point.

5. Water flowing out of the top of the tank = full. No water at the tap = empty tank. Everything else = guess.

## **The Silver system**

The Silver system (my own term) starts its life built around the centrifugal pump (**Fig. 1**). Primary factors in this setup are a high-yield water source, available of utility (or generator) electricity, high head, high usage rates, and the need for immediate installation.

Note: The starting block of the Silver system is a favorite of well drillers everywhere. It is also often installed by individuals who are ignorant of the existence of any alternatives to it. It is a system that best emulates the water system found in houses in the city. It is not efficient or versa-

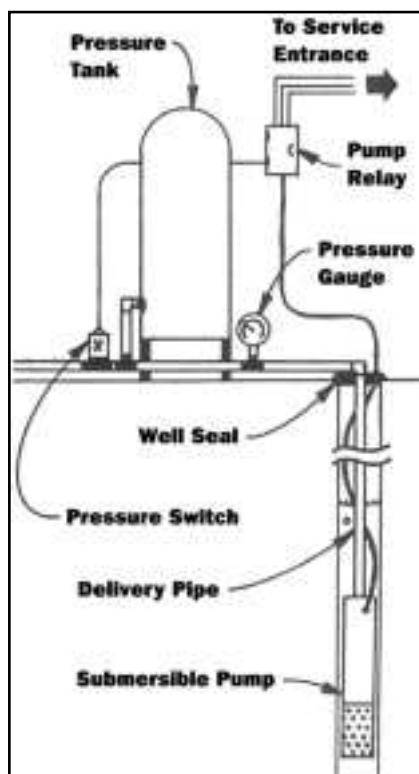


Figure 1: Components of the "demand" type system.

tile. The depth of the well in which the pump hangs is usually increased beyond the point of actually hitting water. While this helps minimize the impact of drawdown, it increases the cost of drilling the well in the first place. Despite these deficiencies, the Silver system can be modified—using a dual (parallel) or piggyback (series) arrangement of a piston pump—to increase its versatility over the basic system. (More on the Gold-Silver system soon.)

The initial setup of the Silver system is composed of a 110V or 220V AC centrifugal-type submersible pump (previously discussed). Additional components required in this system are delivery pipe, electrical wires, level sensor, pressure gauge, pressure tank, pressure switch, screen, torque arrestor, and well seal.

**Delivery Pipe:** In the demand system, the in-well delivery pipe (which transports the pumped water) is usually 1-inch, type PE (black) plastic pipe.

**Electrical Wires, Pump:** Use only code-approved electrical wiring that is specially formulated for water submersion with submersible pumps. If well depth is greater than stocked lengths of wire, use code-approved connectors. Wires are strapped to the side of the delivery pipe to avoid fouling and to keep the wires from chafing against the well wall or casing.

**Level sensor, in-well:** If the water source is ever pumped dry, and you don't catch it right away, the submersible pump may burn out trying to pump air. The in-well level sensor is an automatic means of both sensing this condition and disabling the pump when it occurs. Two probes are lowered into the well. One is positioned just above the pump, the other some distance above it. The magnetic relay into which they connect will stop the motor when water reaches the lower sensor. It will restart power to the pump only after the well has recharged with water to the level of the upper sensor.

**Pressure gauge:** A pressure gauge may be added to the plumbing in the vicinity of the pressure switch (below). At this location, of course, it cannot be used for monitoring the system's operation (unless you frequent the pumphouse). It serves two purposes. Initially, when the system is installed, the gauge assists in the adjustment of the pressure switch to the correct range of operation. Later, the pressure gauge is a good visual indicator if there's some malfunction. It will let you know at a glance what is working and what is not, thereby isolating the problem.

**Pressure switch:** Ever wonder how the water system automatically turns on when you open a faucet? In a demand system, a pressure-sensitive switch detects the lowered pressure, closes its contacts, and energizes the pump relay, starting the submersible motor. When usage stops, the water pressure builds to a pre-adjusted value, the pressure switch's contacts open, the pump's power relay is de-

energized, and the submersible pump stops.

The pressure switch doesn't open and close at one specified pressure. Instead, it closes at some low pressure and opens at some higher pressure. Typical values are 30-50, 35-55, 40-60, etc. The overall range is adjustable, but the difference between the upper (open) and lower (close) points is a built-in specification. If you want a smaller or larger difference, you must buy a different pressure switch.

**Pressure tank:** Water is not compressible. A water system that uses only a pressure switch will suffer from "water hammer." This is the sound of knocks like hammering as the pump switches on and off in its attempt to sustain system pressure. This also causes sputtering at a faucet when it's first turned on and uneven flow when the faucet is in use.

The remedy is the pressure tank. The pressure tank is primarily an air chamber. Unlike water, air is compressible. Inserted in-line, the pressure tank absorbs water hammer and assures an even flow to the faucets at any rate of use below the pump's capacity. The pressure tank acts somewhat like a storage tank since it is possible to get some water from the system without having the pump start up. Still, this is merely a byproduct of the pressure tank's functioning. Indeed, even a 42-gallon pressure tank is not capable of supplying more than 6.5 gallons of water before the pump restarts.

Since air mixes so readily with water, a recurring problem with older-style pressure tanks was their propensity toward waterlogging. Periodically, air had to be pumped in to replace that lost to absorption. This was usually done manually. With suitable controls, it could be automated. Newer-style tanks use floating separators, minimizing the surface area and hence the interaction between water and air. Some tanks even confine the air in a bladder suspended in the tank.

**Screen:** A screen is attached to the intake (upper end) of the submersible pump to filter out anything that would clog the pump. A fine-mesh screen may be added to help filter out anything that would pit the pump's impellers.

While the submersible pump may function two to fifteen years in the well without servicing, the screen may not fare as well. If pumping performance diminishes in time, the first thing that should be checked is the screen. The entire assembly—delivery pipe, wires, and pump—must be pulled for this five-second check and, if clogged, a five-minute cleanup job.

**Torque arrester:** Mounted on the delivery pipe just above the centrifugal pump, the torque arrester is a flexible gadget that makes contact with the well or casing wall, resisting the "twist" of the pump assembly on start-up due to motor torque.

**Well seal:** All wellheads need a sanitary seal. This seal is always watertight and sometimes airtight. In the demand system, the well seal is a pancaked rubber seal with holes bored through it. You buy the one that will fit the diameter of your well and pass the size of delivery pipe and electrical

wires for your pump. Once these have been routed through, the seal is set on the wellhead casing. Upon tightening, it expands against the well casing to affect an impenetrable seal.

## The Gold-Silver system

There's really no reason to view water systems as strictly either/or, demand versus store, piston pump versus submersible pump. Why not a combination?

There are two basic ways that the submersible pump and the piston pump may be merged into one system—side-by-side and piggyback. (See sidebar) Each combines the best features of both pumps (and systems) and effectively neutralizes the disadvantages of each.

**Phase one:** After operating a demand system for a number of years, some friends of mine realized the availability of wind energy at their site and its potential as an alternative energy source for water pumping. Their present system was ill prepared to handle fire fighting and to operate during blackouts. As water usage increased with a newly installed gar-

den and orchard, the frustrated owners were ready to consider alternatives.

An extensive retrofit was designed—a waterpumping wind machine and tower, a piston pump, and plumbing to handle two service pressures.

Using wind energy necessitated a storage tank. While the property did elevate sufficiently to provide gravity flow from a storage tank sited at the highest point, gravity pressurization was not possible. This was not considered a major handicap since all of the

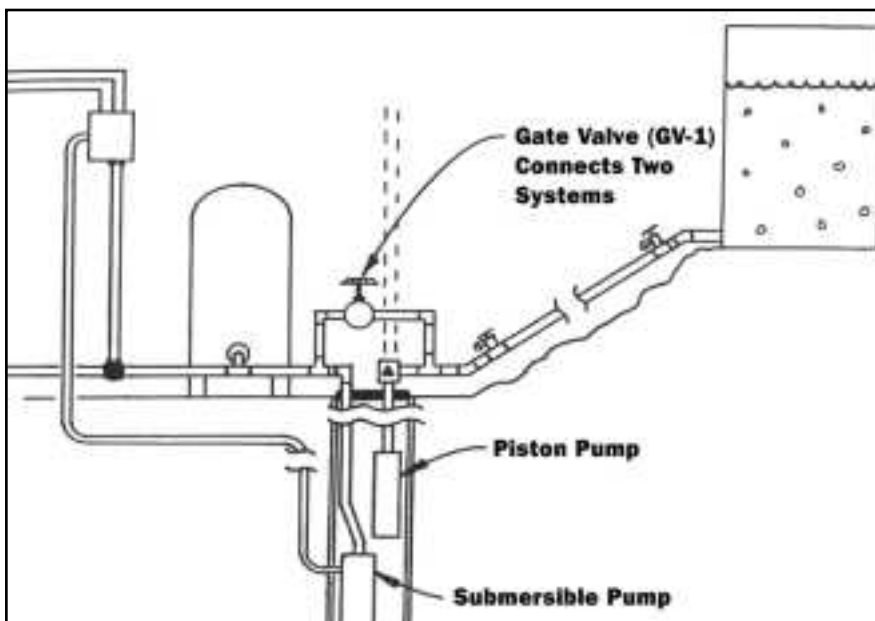


Figure 2: Demand and store type systems joined in a side-by-side method.

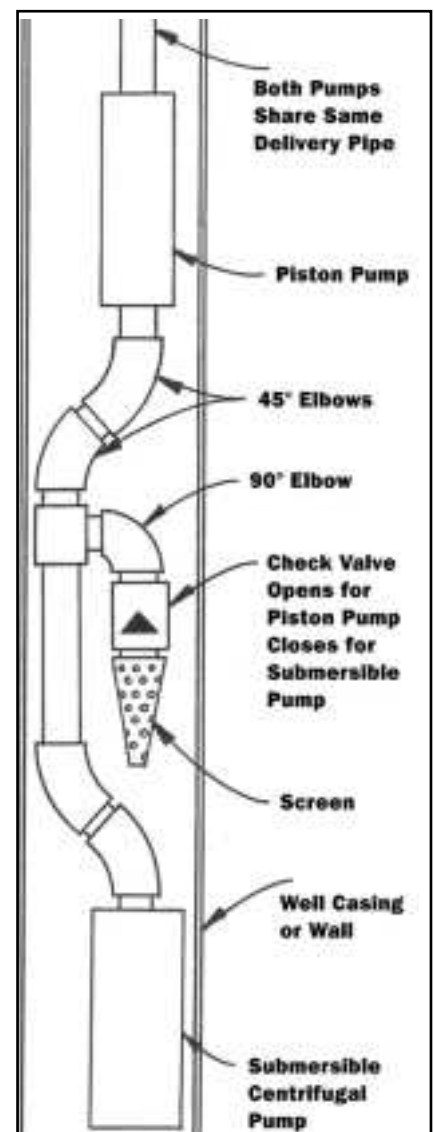


Figure 3: Demand and store type systems joined in a piggyback method.



## Variations of the Gold-Silver System

A store-type and demand-type system may be combined into one system using a side-by-side or piggyback arrangement.

In the side-by-side system, each system is installed independently of the other, with the piston-pump usually positioned above the submersible (See Fig. 2). The plumbing is kept separate through the wellhead and joined, in some fashion, thereafter, in a variety of ways.

In the piggyback arrangement, the submersible pump is joined with the piston pump (See Fig. 3) to feed the same delivery pipe to the surface. While no harm would come of operating both pump mechanisms simultaneously (and, I might add, no gain either), normally only one or the other pump

would be operated at a time. When the piston pump is operational, it draws water through the check valve as it would through a tail pipe. When the submersible pump is operated, it draws water through its own strainer and pumps it through the piston pump and up the delivery pipe.

The piggyback arrangement is illustrated in a number of pump manuals circulated by manufacturers. However, in practice the actual connections between the two pumps cannot be easily made inside a 6-inch well size. There just isn't the room. Instead, a number of 45-degree pipe elbows are needed to offset the interconnecting pipe to accommodate the room taken up by the check valve. It is possible to use flexible pipe between the two to surmount this obstacle, but it's not rec-

ommended. A submersible pump, on startup or shutdown, exhibits a vicious little jerk due to motor torque. Therefore a short section of interconnecting plastic pipe will fatigue in short order and break. This will necessitate pulling the entire system out of the well for repair.

Controls similar in type and function will permit the piggyback arrangement to act alternately as a demand or a store system. In reality, it is both. However, the use of this system presupposes that the owner/operator is utilizing a non-utility energy source as the power unit for the piston pump. For this reason, water pumped to storage from the submersible pump must be limited or the piston pump will have no place to put water when it is functioning.

gardens and orchards were downhill from the ideal site for the tank.

A 2,000-gallon storage tank was purchased and sited. A 20-foot wood tower was built on top of the stone pump house and a water-pumping wind machine was purchased and set atop it. A deep-well piston pump was inserted into the well in addition to the existing submersible pump. Instead of a piggyback system, a side-by-side mounting of the two pumps was chosen (See Fig. 4).

A new wellhead was fashioned to accommodate the unorthodox side-by-side arrangement of these two pumping systems. An overflow pipe was added to handle the well's tendency to become artesian during a few months of the year and the overflow was routed to a nearby garden. A new anti-contamination seal was made to accommodate the 2-inch galvanized pipe for the piston pump and the 1-inch plastic pipe and electrical wires for the submersible pump. A stuffing box was located at the wellhead and the needed length of pump rod and pipe was routed up through the ceiling

of the pump house to the wind machine perched overhead.

The two water systems were, at this stage, wholly separate. Any water that was pumped from the wind machine to the tank was used at low pressure in

the gardens and orchards. All household water was supplied by the utility-powered submersible pump. Backup hoses from the submersible pump system were routed to the gardens and orchards to take care of any watering

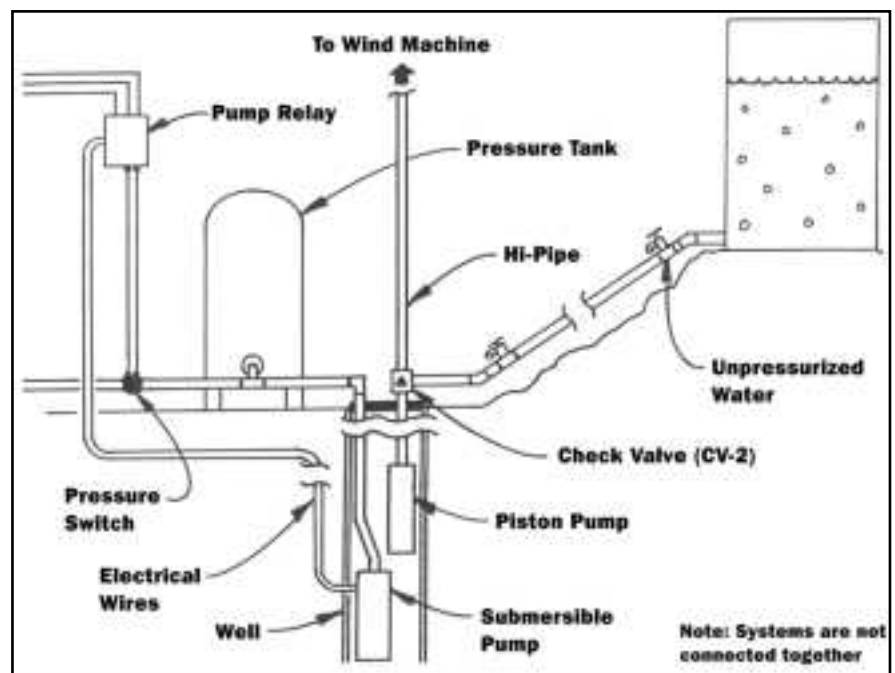


Figure 4: Phase one of the Gold-Silver system

needs beyond the capability of the wind-pumped water system. They were never used. Once the system was in and operating, it was quickly evident that the wind pump was able to handle all of the outdoor watering needs. Indeed, the system exceeded the nearby garden's water requirements, and the owners had to shut down the wind machine manually (via the handcrank in the wellhouse) again and again. Any uncertainty or disbelief on the part of the owners that the added system would handle garden and orchard and, perhaps, some of the household watering needs too, evaporated. They were ready for phase two.

**Phase two:** Phase two of the Silver System tied the two systems together with a gate valve between the pipes for each system at the wellhead. This served two functions. First, during a blackout, the submersible doesn't work. If there's water in the tank and there's a need for water in the household, opening the gate valve feeds water from the tank directly into the house. In times of need, water at any pressure is hardly "inconvenient."

The secondary function of the gate valve is that it provides a quick and easy way to fill the water tank to any desired level using the submersible pump. This is particularly handy if a forest fire or tornado is on its way. Simply opening the gate valve has the same effect as opening any water faucet, causing water to flow into the tank until the gate valve has been closed.

For a mere twenty dollars in parts—a gate valve, pipe, a union, and a few pipe tees—this tie-in does an awful lot.

**Final comments:** As simple as the Gold, Silver, and Gold-Silver systems are, it may not appear that way to the novice. I highly recommend making a system diagram. This will certainly help family, friends, and visitors to understand the system. It will help you remember, too, and will prove invaluable if something doesn't seem to be working correctly. You can't

troubleshoot something if you can't remember how things are supposed to work. Clearly label all switches—pressure, level sensor, reserve bypass, etc.—in the system and key them to the drawing.

Whatever type of water system you eventually design and install, I hope it brings you and your land life, utility, and happiness.

(Some text and drawings in this article were taken from Waterworks: An Owner-Builder Guide to Rural Water Systems (Michael Hackleman, Peace Press, 1983, 172pp), The Homebuilt Wind-Generated Electricity Handbook (Michael Hackleman, Peace Press, 1975, 194pp) and At Home with Alternative Energy (Michael Hackleman, Peace Press, 1980, 146pp) For a publications list, send an SASE to: Michael Hackleman, PO Box 327, Willits, CA 95490.) Δ

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# TRY THIS SIMPLE SLOW COOKER

BY REV. J.D. HOOKER

**W**hile on a church outing at Indian Springs Campground, just south of Garrett, Indiana, my wife called me over to have a look at the unique homemade slow cooker one of the young mothers was using. I knew instantly that I was looking at something most of *BHM*'s other readers would find just as interesting as I did.

"Actually," the young lady explained to us, "I was just looking for a really cheap, but effective, way to keep food hot when we take the boys on picnics and such. It took me a while before I figured out that this could cook things just as well as my electric crock pot does. Since then, though, I use this nearly every day."

Her homebuilt slow cooker is exceptionally simple, both to fashion and to use. So naturally, a couple of days later I took a couple of hours and put one together for my wife, Connie.

All that I needed to put together a nice working replica of the simple slow cooker this young church-going

mother had fashioned was a sheet of two-inch thick styrofoam insulation (the tough blue stuff most concrete suppliers sell for insulating footings is ideal for this), an old stainless steel stock pot and lid (bought for \$2.50 at the Salvation Army store), some paste type car wax, a little bit of construction adhesive, one spray can of expanding styrofoam insulation, and part of a cardboard box.

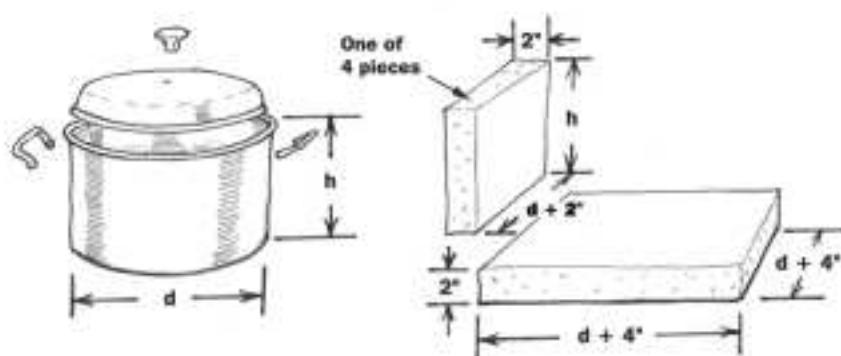
First off, I cut five pieces of the two-inch thick insulation to shape a square box into which the stock pot would slide easily, as shown in Figure 1. The four side pieces are cut the same height as the pot and two inches wider than the pot's diameter. The bottom piece is cut square four inches longer than the diameter of the pot. After gluing this box together with the construction adhesive, I used the automotive wax to polish the exterior of the stock pot, using three coats and buffing each to a high shine. This is done after removal of the handles to make the pot a smooth fit in the box.

Next I inserted the pot into the foam box, and used some of the expanding foam insulation to fill in the empty spaces at the corners for a perfect fit, as shown.

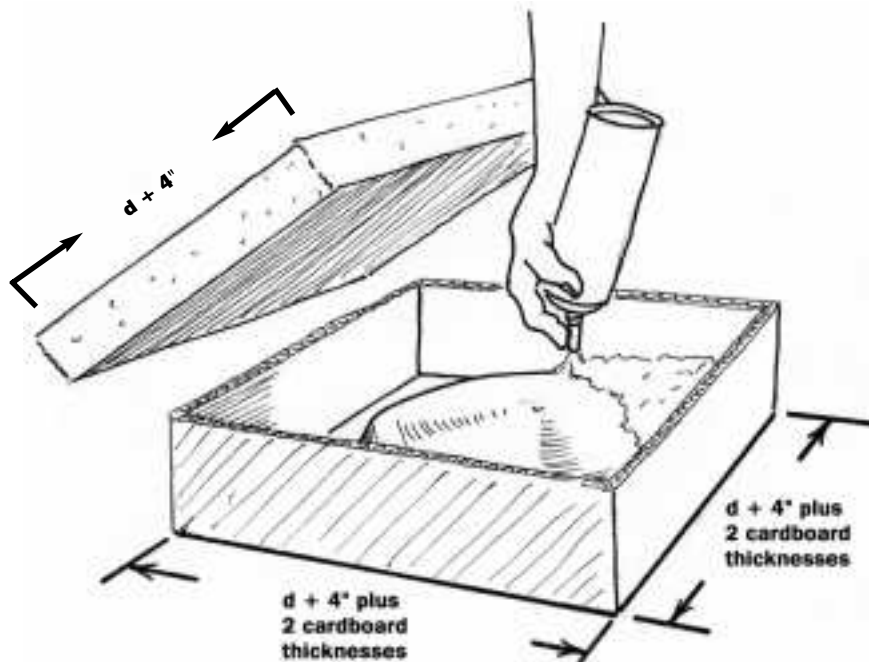
Later, once this canned foam had set up, I carefully worked the well-waxed pot loose and removed it from the insulated box. Then I really lightly sanded the inside of the hardened insulation with coarse sandpaper so the pot would just slip in and out easily for washing after each use.

I waxed the lid in the same fashion, then set it inside of the cut-down cardboard box which had simply been smeared with a heavy layer of the paste wax (Figure 2). Then I cut a piece of the two-inch styrofoam to just fit inside of the box, covered the lid with the remainder of the can of expanding foam, and pressed the cut styrofoam piece on top, as shown. Later, I lightly sanded the inside of this lid cover so it could be easily removed and replaced on the top of the slow cooker.

Once the whole thing was completed, I assembled it together. At each corner I shoved a three-inch-long piece of half-inch wooden dowel down through the top foam cover into the sides of the insulated box. This should ensure that everything lines up perfectly, but probably isn't really necessary (Figure 3).



**Figure 1:** Cut and glue together five pieces of two-inch styrofoam pieces, insert well-waxed pot after removing the handles, and fill empty spaces with expanding foam insulation. Note the dimensions of the five foam pieces.



**Figure 2:** Place waxed lid (after removing lid handle) inside waxed cardboard box, cover with expanding foam insulation, then press piece of two-inch thick foam insulation into box, on top of the expanding foam. Note the dimensions.

The day after I'd finished up, my wife was ready to use her new cooking device. First she strained off the water in which a pound of speckled Jacob's cattle beans had been soaked, reserving the liquid in a separate pan while the beans went inside of the insulated pot.

Next she finely diced about half a pound of leftover ham and a large onion and added them to the water she'd drained off the beans. Then she set the pan on the stove and brought

the mix to a full, rapid boil. This boiling mixture was then poured in with the beans inside the insulated pot, and the lid and the insulated cover were quickly set in place on top. The whole thing was then just left alone to sit for about three hours.

At supper time, we found the contents still piping hot, and indistinguishable from ham and beans prepared in any regular crock pot.

You can use any recipe that you'd normally use in any other slow cooker. The difference is that you must always bring the cooking liquid to a full rolling boil and add it to the pot last, after all of the other ingredients. You also need to close the cooker up as quickly as you can once the boiling liquid has been added. Having something of an artistic nature, my wife rounded off the corners of our new slow cooker with some sandpaper, covered the exterior with paint, and stenciled colorful flower designs all over the outside. I'll admit it now looks just as good as it works, but I'd still say the painting is optional.  $\Delta$



**Figure 3:** After assembling the two slow cooker pieces, you can secure them together with dowels if you wish. My wife rounded off the corners of ours, then decorated it.

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